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ADRENALIN TABLETS, No. 2.

A new strength; each contains 1–200 grain, and when dissolved in 5 minims of water produces a 1 : 1000 solution (an average dose for hypodermic administration, or the tablet may be allowed to dissolve on the tongue). In tubes of 25.

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In two strengths, respectively containing 1–200 grain and 1–400 grain of Adrenalin with 1–3 grain and 1–6 grain of Novocaine. For preparing analgesic and ischæmic solutions for injection prior to dental or minor surgical operations. In tubes of 25.

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In addition to those hitherto supplied (Staphylococcus, Streptococcus, Gonococcus, Tubercle and Typhoid), the laboratories of the Department of Therapeutic Inoculation in St. Mary's Hospital, Director, Sir Almroth E. Wright, now furnish Acne Bacillus Vaccine, Mixed Vaccine for Acne, Influenza Bacillus Vaccine, Pneumococcus Vaccine, and Neoformans Vaccine. Full particulars on application.

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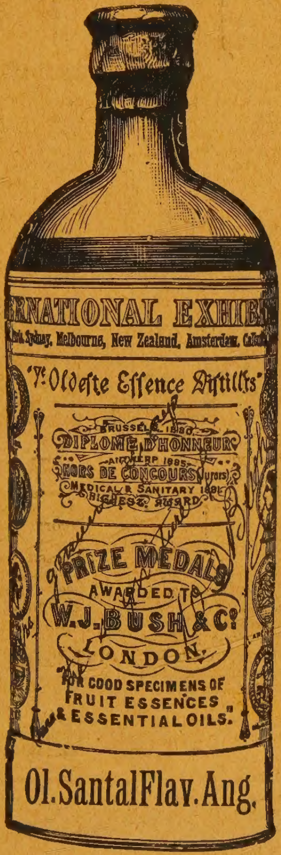

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CONTRIBUTED TO BRITISH AND FOREIGN JOURNALS

FROM JULY 1, 1908, TO JUNE 30, 1909,

WITH THE

TRANSACTIONS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE

AT THE

FORTY-SIXTH ANNUAL MEETING

HELD IN

NEWCASTLE,

JULY, 1909.

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BRITISH PHARMACEUTICAL CONFERENCE.

INAUGURAL MEETING HELD AT NEWCASTLE-ON-TYNE IN 1863.

Years.	*Places of Meeting.*	*Presidents.*	*Vice-Presidents.*	*Local Secretaries.*
1864	Bath	Henry Deane, F.L.S.	Prof. Bentley, F.L.S. Dr. Edwards, F.C.S. R. W. Giles, F.C.S. Prof. Redwood, F.C.S.	J. C. Pooley.
1865	Birmingham	Henry Deane, F.L.S.	Prof. Bentley, F.L.S. Dr. Edwards, F.C.S. W. Southall. J. P. Tylee.	W. Southall, Jun.
1866	Nottingham	Prof. Bentley, F.L.S.	Dr. Edwards, F.C.S. D. Hanbury, F.R.S. Samuel Parr. W. W. Stoddart, F.G.S.	J. H. Atherton, F.C.S.
1867	Dundee	Prof. Bentley, F.L.S.	D. Hanbury, F.R.S. J. Ince, F.L.S. D. Russell. W. W. Stoddart, F.G.S.	J. Hodge.
1868	Norwich	Daniel Hanbury, F.R.S.	R. Fitch, F.G.S. J. Ince, F.L.S. W. W. Stoddart, F.G.S. J. R. Young.	F. Sutton, F.C.S.
1869	Exeter	Daniel Hanbury, F.R.S.	G. Cooper. H. S. Evans, F.C.S. J. Ince, F.L.S. W. W. Stoddart, F.G.S.	M. Husband.
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1871	Edinburgh	W. W. Stoddart, F.C.S.	J. Abraham. H. C. Baildon. J. Ince, F.L.S. J. Williams, F.C.S.	J. Mackay, F.C.S.
1872	Brighton	H. B. Brady, F.R.S.	J. Ince, F.L.S. R. Reynolds, F.C.S. W. D. Savage. J. Williams, F.C.S.	T. Glaisyer.
1873	Bradford	H. B. Brady, F.R.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. F. M. Rimmington, F.C.S. J. Williams, F.C.S.	R. Parkinson, Ph.D.
1874	London	Thos. B. Groves, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. Chas. H. Savory. J. Williams, F.C.S.	M. Carteighe, F.C.S.
1875	Bristol	Thos. B. Groves, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. Chas. Boorne. Peter Squire, F.L.S.	J. Pitman.
1876	Glasgow	Prof. Redwood, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. E. C. C. Stanford, F.C.S. D. Frazer.	A. Kinninmont.
1877	Plymouth	Prof. Redwood, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. A. P. Balkwill. J. Williams, F.C.S.	R. J. Clark.
1878	Dublin	G. F. Schacht, F.C.S.	Prof. Tichborne, F.C.S. R. Reynolds, F.C.S. R. W. Pring, L.A.H.D. J. Williams, F.C.S.	W. Hayes.
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1880	Swansea	W. Southall, F.L.S.	R. Reynolds, F.C.S. G. W. Sandford. W. Ward, F.C.S. N. M. Grose.	J. Hughes.
1881	York	R. Reynolds, F.C.S.	Prof. Attfield, F.R.S. R. Davison. N. M. Grose. C. Umney, F.C.S.	J. Sowray.
1882	Southampton	Prof. Attfield, F.R.S.	R. Chipperfield. T. Greenish, F.C.S. Prof. Tichborne, LL.D. J. R. Young.	O. R. Dawson.

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1884	Hastings	J. Williams, F.C.S.	S. R. Atkins. J. Bell. M. Carteighe, F.C.S. J. R. Young.	F. Rossiter.
1885	Aberdeen	J. B. Stephenson.	F. B. Benger, F.C.S. M. Carteighe, F.C.S. C. Ekin, F.C.S. J. P. Kay.	A. Strachan.
1886	Birmingham	T. Greenish, F.C.S.	T. Barclay. F. B. Benger, F.C.S. M. Carteighe, F.C.S. C. Ekin, F.C.S.	Chas. Thompson.
1887	Manchester	S. R. Atkins, J.P.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. C. Symes, Ph.D. G. S. Woolley.	F. B. Benger, F.C.S.
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1890	Leeds	C. Umney, F.I.C., F.C.S.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. A. Kinninmont, F.C.S. W. Smeeton.	F. W. Branson, F.C.S.
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1893	Nottingham	Octavius Corder.	M. Carteighe, F.C.S. J. Laidlaw Ewing. W. Hayes. R. Fitz Hugh.	C. A. Bolton.
1894	Oxford	N. H. Martin, F.L.S., F.R.M.S.	M. Carteighe, F.C.S. R. H. Davies, F.C.S W. Hayes. G. T. Prior.	H. Mathews.
1895	Bournemouth	N. H. Martin, F.L.S., F.R.M.S.	M. Carteighe, F.C.S. J. Laidlaw Ewing. W. Hayes. J. A. Toone.	Stewart Hardwick.
1896	Liverpool	W. Martindale, F.C.S.	M. Carteighe, F.C.S. J. Laidlaw Ewing. M. Conroy, F.C.S. W. Hayes.	T. H. Wardleworth. H. O. Dutton (Birkenhead).
1897	Glasgow	Dr. C. Symes, Ph.C.	Walter Hills. J. Laidlaw Ewing. W. F. Wells. R. McAdam.	J. A. Russell.
1898	Belfast	Dr. C. Symes, Ph.C.	Walter Hills. J. Laidlaw Ewing. J. C. C. Payne, J.P. W. F. Wells.	R. W. McKnight. W. J. Rankin.
1899	Plymouth	J. C. C. Payne, J.P., Ph.C.	Walter Hills, F.C.S. R. J. Downes. John Moss, F.I.C., F.C.S. C. J. Park.	J. Davy Turney.
1900	London	E. M. Holmes, F.L.S., Ph.C.	R. J. Downes, Ph.C. Walter Hills, F.C.S. John Moss, F.I.C., F.C.S. J. F. Harrington, Ph.C.	W. Warren. Herbert Cracknell.
1901	Dublin	G. C. Druce, M.A., F.L.S.	G. T. W. Newsholme, F.C.S. G. D. Beggs, M.P.S.I. Peter Boa, F.C.S. Prof. Tichborne, Ph.D.	J. I. Bernard.

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(*a*) To bring under the notice of pharmacists, principals, and their assistants, in their districts, who are unassociated with the Conference, the advantage of membership with it, and by personal effort to try and induce them to join.

(*b*) To assist in stimulating research by asking pharmacists, who have the time, ability, and disposition, to contribute from time to time a paper or useful note to the annual meetings.

(*c*) To endeavour to induce defaulters to continue their membership.

(*d*) To take generally a watchful and sympathetic interest in the affairs of the Conference.

To render those services voluntarily at times convenient to themselves and as opportunity offers.

THE

BRITISH PHARMACEUTICAL CONFERENCE.

AN ORGANIZATION ESTABLISHED IN 1863 FOR THE ENCOURAGEMENT OF PHARMACEUTICAL RESEARCH, AND THE PROMOTION OF FRIENDLY INTERCOURSE AND UNION AMONGST PHARMACISTS.

THE most important ways in which a member can aid the objects of the Conference are by introducing new members, suggesting subjects for investigation, working upon subjects suggested by himself or by others, contributing information tending to throw light on questions relating to adulterations and impurities, or collecting and forwarding specimens whose examination would afford similar information. Personal attendance at the yearly gatherings, or the mere payment of the annual subscription, will also greatly strengthen the hands of the executive.

A list of subjects suggested for research is published early in the year (see page 177). Resulting papers are read at the annual meeting of the members; but new facts that are discovered during an investigation may be at once published by an author at a meeting of a scientific society, or in a scientific journal, or in any other way he may desire; in that case, he is expected to send a short report on the subject to the Conference.

The annual meeting for 1910 will be held at Cambridge.

Gentlemen desiring to join the Conference can be nominated at any time on applying to the Secretaries, or any other officer or member. The yearly subscription is payable in advance, on January 1st. The amount, which includes free delivery of the Year-Book, is fixed at a minimum of 7*s.* 6*d.* for members residing within the Postal Union. Further information may be obtained from

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THE YEAR-BOOK OF PHARMACY.

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CHEMISTRY

YEAR-BOOK OF PHARMACY

PART I

CHEMISTRY

Abies pectinata Cones, Borneol in Essential Oil of. (*Schimmels' Report, April,* **1909,** 80.) Borneol occurs in small amount in "templin" oil.

Acacia Flowers yielding Oil. (*Schimmels' Report, April,* **1909,** 30.) Two species of *Acacia* are cultivated for their flowers, *A. farnesiana* and *A. cavenia.* The former is known in Provence as "cassie ancienne" and the latter as "cassie romaine." The flowers of *A. farnesiana* have the finer odour, and are more expensive; the plant is more delicate and requires more careful culture. (See also *Y.B.*, **1904,** 15, 16; **1907,** 40.)

Acetic Acid, Glacial, Presence of Formic Acid in. H. Ost and F. Klein. (*Apoth. Zeit.*, **23,** 643.) Five out of six samples of "chemically pure" glacial acetic acid were found to contain notable quantities of formic acid. To determine the amount 10 c.c. of the acid is heated in a closed vessel in an atmosphere of CO_2 with 50 c.c. of strong H_2SO_4 which decomposes the HCOOH quantitatively into CO and H_2O. When action is complete, the CO_2 is absorbed over KOH and the residual CO measured; 100 c.c. of CO = 0·2056 Gm. of HCOOH.

Acetosalicylic Acid. (*Evans' Analyt. Notes,* **1908,** 3.) The m.p. of commercial samples lies between 134°–136°C.

Aconine, Oxidation Products of. H. Schulze. (*Berichte Pharm.*, **246**, 281.) When aconine, $C_{25}H_{41}NO_9$ is oxidized with CrO_3 a new base, $C_{24}H_{27}NO_8$ or $C_{24}H_{35}NO_8$ is formed; if oxidation is carried further, an azo-acid of the formula $C_{24}H_{33}NO_9$ is formed. Although aconine contains five OH groups, the new base contains but four; of which three are readily esterified by acetyl chloride. The acid $C_{24}H_{33}NO_9$ contains but three the fourth having been oxidized into CO.

Aconite Root. (*Evans' Analyt. Notes*, **1908**, 3.) Four samples were assayed by Panchaud's process. Three were foreign, and yielded 1·21, 1·58 and 1·25 per cent. total alkaloid. An English sample yielded 1·78 per cent.

Aconite Root, Alkaloidal Assay of. L. H. Bernegau. (*Amer. J. Pharm.*, **81**, 122.) Twelve Gm. of the powdered drug is shaken up frequently with Et_2O, 100 c.c.; $CHCl_3$, 21 c.c.; and saturated $NaHCO_3$ solution, 12 to 15 c.c. Then 60 c.c., = 6 Gm. of drug, is filtered off. This is shaken out with 50, 40, and 30 c.c. of 1 : 100 H_2SO_4. It is not necessary to wait for the emulsified portion to separate; this is run off each time into a second separation with the acid liquid. On again shaking very vigorously and allowing to stand separation will take place in a few seconds. The acid liquid is then transferred to a fresh separator, and the remaining froth and ether washed again with 30 to 40 c.c. of H_2SO_4 1 : 100. The separated acid liquid is then bulked with the rest. The alkaloid determination is then continued in the usual manner.

Aconites, Japanese, Alkaloids from. K. Makoshi. (*Zeits. allgem. Oesterr. Apoth. Verein.*, **47**, 229.) The true *Aconitum fischeri* tubers known as "Bushi" afforded an amorphous base jesaconitine, yielding benzoic and anisic acids, and aconine when hydrolized. It also contains another base soluble in $CHCl_3$. Roots of a variety of *A. fischeri* known as "Kusauzu," grown in Hondo, yield japaconitine having the formula $C_{34}H_{47}NO_{11}$, m.p. 202–203·5°. This formula is the same as that attributed by Schulze to aconitine from *A. napellus*, but that base melts at 197°C. The two alkaloids are, therefore, isomeric. The triacetyl derivative of japaconitine melts at 189°C. The triacetyl melting at 166°C. described by Dunstan and Read could not be isolated. Japaconine differs from aconine in forming hygroscopic salts. It affords a well crystallized tetra-acetyl derivative, m.p. 236–237°C.

Agrostemma githago, Saponin of. J. Brandt and E. Mayr. (*Apoth. Zeit.*, **23**, 669.) The saponin of *Agrostemma githago* splits up into a neutral sapotoxin, which is not precipitated by lead acetate, and agrostemmic acid, which is thrown down by that reagent. Both these bodies give the same hydrolysis products, sapogenin, dextrose, galactose, and possibly arabinose. By fusing the sapogenin with KOH a crystalline acid $C_{30}H_{46}O_4$ has been obtained, which gives the dimethyl ether $C_{30}H_{44}(CH_3)_2O$, crystallizing in fine needles.

Aleurites cordata, Fixed Oil of the Seeds of. A. Rathje. (*Archiv. Pharm.*, **246**, 706.) Two specimens of pure "Tung oil"—one of Chinese, the other of Japanese origin—were examined. The results obtained were closely similar to those already published for "Tung oil" derived from *Aleurites fordii* and *A. triloba*. (*Y.B.*, **1908**, 8.)

Alkaloids, New Indicator for. E. Rupp and R. Loose. (*Berichte*, **41**, 3905.) Para-dimethylamino-azobenzene-ortho-carboxylic acid, named "methyl red," is stated to be as sensitive towards feeble bases as phenolphthalein is to alkalies. It shows colours similar to those of methyl orange, yellow with alkali and bluish red with acid. Its reaction is sharper than that of methyl orange. It may be used with N/100 solutions. The reagent is a 0·2 per cent. solution in EtOH.

Aloe Woods, Javan. W. G. Boorsma. (*Schimmels' Report, November*, **1909**, 19, 49.) *Gonostylus miquelianus*, used in Java under the name "Kaju garu," varies in appearance, due to the resinification of the wood. The dark resinified portions, when distilled, yielded Eyken a fragrant volatile body gonystyol. Unresinified wood yields no gonystyol. A species of *Aquilaria*, probably *A. malaccensis*, is also used in Java for burning. It yields a small quantity of a volatile fragrant body, resembling but not identical with gonystyol. In this also, only the resinified wood is fragrant. *Wikstroemia tenuiramis*, known as "tementak" or "menameng," gives a wood which is fragrant when burned. It is used in Banka. *Excoecaria agallocha* wood, "menegen," although fragrant when burned, gave no appreciable amount of volatile matter when distilled. *Dalbergia cumingiana* is largely employed in the Dutch East Indies under the name of "Kaju laka" for fumigation, and yields essential oil with an odour like cineol. The yield is about 0·5 per cent; sp. gr. 0·891 at 26°C.; a_D.—4°31′

at 26°C.; ester value, 5·0; acetyl value, 116; b.p. 260–310°C. It contained no aldehydes. *A. canarium* wood, known as "Kaju *rasamala*," which burns with a storax-like odour, gives 0·2 per cent. of aromatic pungent-tasting volatile oil. Et_2O extracts about 2 per cent. of an ester-like body from the wood, and EtOH a substance with the odour of storax. *Celsis reticulata*, although included among the "scented" woods of Java, is not pleasant in odour, since it contains skatol, and is known as "Kaju tai." In old dry wood the stercoracious odour disappears, and with it the skatol. Petroleum ether and Et_2O give unpleasant smelling residues, but these contain neither skatol nor indol. The EtOH extract contains a nitrogenous body allied to skatol. *Alyxia stellata* also furnishes an incense wood, but it yields no essential oil.

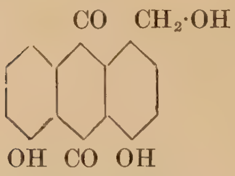
Aloes from the Sicilian Aloe, and its Aloin, Sicaloin. G. Condò Vissicchio. (*Archiv. Pharm.*, **247**, 81.) Aloes prepared by evaporating the freshly exuded juice of the leaves of the Sicilian aloe to dryness on the water-bath, is reddish-yellow, aromatic, bitter, almost insoluble in cold water but readily dissolved on warming. It contains no less than 85·5 per cent. of a new aloin, sicaloin, $C_{15}H_{20}O_7$. When pure this forms snow-white crystals; it is soluble in water, and its solutions are colourless. In the cold it gives no cupro-reaction, but a greenish tint on adding water. With iodic acid reagent, Borntraeger's, Klunge's, and Schouteten's tests, it gives negative results, thus being distinguished from other known aloins. It contains one $O{\cdot}CH_3$ group and 8·65 per cent. of H_2O. Besides sicaloin, the original aloes yield 1·9 per cent. of resin, 0·08 per cent. of emodin, and 4·5 per cent. of ash. The last figure is much higher than that generally accepted as normal for pure aloes. The juice from leaves cut in March gave 8·2 per cent. of aloes: the yield from five subsequent collections progressively increased, reaching 25·55 per cent. in May.

Aloesol, a Complex Phenol prepared from certain Aloes. E. Léger. (*J. Pharm. Chim.* [6], **28**, 529.) On adding $KClO_3$ to a solution of Cape or Uganda aloes in HCl, besides chloro-aloins, a body $C_{11}H_4Cl_4O_3$. is obtained in almost colourless needles. This is not an oxymethylanthraquinone tetrachloride, since it contains a phenolic function: it is therefore supposed to be the tetrachloride of a phenol not yet isolated. This tetrachloride is distinguished from other chloro-compounds by its almost complete insolubility in hot alcohol. It is quite insoluble in water but dissolves in dilute alkalies and in ammonia; the combinations formed are precipitated by excess of alkali in gelatinous masses of micro-crystals; the product from Cape aloes melts at 267·7°C. (corr.): that from Uganda aloes at 268·6°C. (corr.). It sublimes slightly above the m.p. in fine tabular crystals. Several derivatives are described.

Aloin, Colour Reaction of, with Alkaloidal Solutions. J. Lothian. (*Pharm. J.* [4], **28,** 428.) A solution of aloin in dilute alcohol gives cherry-red to purple-red colourations with narcotine, morphine, codeine, papaverine, strychnine, brucine, cocaine, atropine, quinine, and veratrine. Caffeine does not give the reaction. The salts of the alkaloids give the reaction as a rule (cocaine hydrochloride does not). The purple-red colours become orange-red with acids and greenish with alkalies. Aloes and aloin are found to give red colours with various galenical preparations containing the alkaloids of the opium alkaloids; narcotine gives the most intense reaction, a solution of 1 : 10,000 giving a bright colour with aloin; in the case of strychnine a solution containing only 1 : 100,000 gives a distinct cherry-red colour, especially after warming and standing. Emodin does not give the reaction.

Aloins, Constitution of. R. Robinson and J. L. Simonsen. (*Proc. Chem. Soc.*, **26,** 76.) Investigation in progress on the constitution of the aloins has afforded results which throw light on the structure of rhein and of aloe-emodin. On oxidizing the acetyl derivative of barbaloin with CrO_3 it affords diacetyl rhein, m.p. 245°; investigation of rhein give the definite formula $C_{15}H_8O_6$ for that body and show that it is dihydroxy-anthraquinone-carboxylic acid.

Since aloe-emodin is a trihydroxymethylanthraquinone and yields rhein on oxidation, one of the OH groups must be in the methyl group. Aloe-emodin is therefore probably dihydroxyanthraquinol-carbinol. There is reason to believe that rhein is chrysazincarboxylic acid with the carbonyl group in the α position; for barbaloin gives tetranitrochrysazin on treatment with HNO_3, and aloe-emodin gives a-methylanthracene on distillation with zinc dust. If chrysazin is 1 : 8 dihydroxy-anthraquinone, then aloe-emodin would have the structure—



and rhein would be the corresponding acid. Aloetic acid, obtained by oxidizing and nitrating aloin, is not tetranitroanthraquinone but dinitroso-dinitro chrysazin ; and aloe-chrysin obtained by oxidizing aloin with CrO_3 is the aldehyde intermediate between the primary alcohol, aloe-emodin and the carboxylic acid, rhein.

Anethol, Decomposition Products of. P. Hoering and K. P. Graelert. (*Berichte*, **42**, 1204.) The so-called " photo-anethol " described by De Varda as being formed from anethol by the action of direct sunlight is found to be dimethylstilbene, similar to that obtained from anisoin, and not a polymer of anethol. Whether this is derived from the presence of anise-aldehyde as an impurity in the anethol under observation is not yet determined, but the inference is that this is not the case. Besides dimethylstilbene, other products are formed by the action of light on anethol.

Animal and Vegetable Fibres, Method of distinguishing, with Oleic Acid. A. Manea. *Chem. Centralb.*, **1908, 2,** 1702. Vegetable fibres, such as cotton, also cellulose, nitrocellulose, celluloid, artificial silk, starch and other carbohydrates, when mixed with oleic acid and H_2SO_4, give a rose red colour on adding water. The colour is formed by the heat occasioned by the latter addition. It is not given by stearic acid nor by other fatty acids except oleic acid, so that the reaction serves to detect the latter in a mixture of fatty acids. A few drops of the oil are mixed with H_2SO_4 and cotton ; the mixture is diluted with water, when a deep red colour appears, if oleic acid or its glycendes are present ; on further dilution this changes to violet. Animal fibres do not give the reaction. It therefore serves also to distinguish woollen textile fabrics from cotton, and natural from artificial silk.

Anthemis nobilis, Essential Oil of. J. Henderson. (*Pharm. J.* [4], **27**, 683.) The source of commercial chamomile oil is discussed, and the following table of results obtained by the author with authentic specimens of oil given :

	Source.	Sp. gr.	Acid Value.	Ester Value.	$[\alpha]_D$ 13° to 15°C.
A*	Ransom, 1904	0·9083	7·8	297	Inactive.
B*	Ransom, 1908	0·9063	4	313	Inactive.
C*	Ransom, 1908	0·9085	4	303	Inactive.
D	Wallington, distilled from fresh plants	0·9088	3·3	280	0·5°
E	English, distilled Oil from fresh plants	0·9085	2·2	295	Inactive.

* Dry double flower-heads.

Apocynum androsaemifolium, Constituents of. C. W. Moore. (*Proc. Chem. Soc.*, **26**, 85.) The dried rhizome of *Apocynum androsaemifolium* contains a small amount of volatile oil; apocynin (acetovanillone); ipuranol; palmitic, stearic, oleic and linolic acids; two new alcohols, androsterol $C_{30}H_{49}{\cdot}OH$, m.p. 208-210°C.; and homo-androsterol, $C_{27}H_{43}{\cdot}OH$, m.p. 192°C.; and a new, extremely bitter toxic substance, apocynamarin, $C_{28}H_{36}O_6,2H_2O$, m.p. 170–175°C. This is the principal active constituent. The apocynin is present in the form of the glucoside, androsin, $CH_3{\cdot}CO{\cdot}C_6H_3(O{\cdot}CH_3){\cdot}O{\cdot}C_6H_{11}O_5,2H_2O$, m.p. 218–220°C.

Apocynum cannabinum; Cynotoxin, a New Dilactone from. H. Finnemore. (*Proc. Chem. Soc.*, **26**, 77.) In addition to apocynin (*Y.B.*, **1908**, 20) the aqueous solution of the alcoholic extract of *Apocynum cannabinum*, after removing the apocynin by shaking out with Et_2O, yields to $CHCl_3$ a crystalline substance, cynotoxin, $C_{20}H_{28}O_6$; m.p. 165°C. with decomposition. It occurs in well defined, small, white, apparently rhombic pyramids, sparingly soluble in water and in organic solvents; it possesses an intense physiological activity, and an extremely bitter taste. It resembles the digitalis group in its pharmacological action and is very poisonous. It is a dilactone either of Kilianis digitic acid, or of a closely related isomeride. The pharmacological action of apocynin is negligible.

Apomorphine Hydrochloride, Hydration of, and Reactions for. E. Schmidt (*Apoth. Zeit.*, **23**, 657), and D. B. Dott (*Pharm. J.* [4], **27**, 801.) Commercial apomorphine hydrochloride is not the anhydrous salt originally described by Wright and Matthieson (*Y.B.*, **1870**, 104), nor does it contain either ½ mol. or 1 mol. H_2O, as has been stated. Samples examined lost in weight from 3·64 to 3·95 per cent. when exposed in the desiccator.

Fe_2Cl_6 is a very sensitive reagent for apomorphine hydrochloride. One drop of the solution imparts a blue colour to 10 c.c. of a 1 : 10,000 solution of the salt. On adding 1 c.c. of $CHCl_3$ to a similar solution, rendering alkaline with NaOH and shaking up in contact with the air, the aqueous liquid acquires a violet red tint and the $CHCl_3$ becomes blue.

Dott, commenting on the above, finds that the analytical figures for the crystalline salt accord more closely with the formula $C_{34}H_{36}N_2O_52HCl + 2H_2O$, and not with $2C_{17}H_{17}NO_2HCl + H_2O$.

Apple Juice, Test to indicate the Presence of. B. T. P. Baker and E. Russell. (*Analyst*, **34**, 132.) Many fraudulent imitations devoid of apple juice are sold as cider. Although no definite standards can be laid down for genuine cider, it has been established that flavoured aerated beverages which contain no juice of the apple cannot legally be supplied under the name of cider. The presence or absence of apple juice in a beverage may be thus determined. One hundred c.c. of the liquid is evaporated to 10 c.c., and then shaken out with an equal volume of acetic ether. After separation, the acetic ether is floated on a few c.c. of lime water in a test tube. If apple juice be present a band of a clear yellow colour appears at the zone of contact. This varies in tint and intensity with the juice of different kinds of apples. The test will indicate with certainty the presence of 1 part of apple juice in 1,000 of beverage.

Arbutin, Distribution of. A. Fichtenholz. (*J. Pharm. Chim.* [6], **28**, 255.) The so-called arbutin, originally isolated by Kawalier in 1852 from *Arctostaphylos uva ursi* leaves, has been shown by Schiff to be an indefinite mixture of arbutin and methyl-arbutin; hitherto pure arbutin has not been isolated as a plant constituent. The mixture of the two glucosides so-called has been found in certain of the *Ericaceae*; it was isolated in 1864 by Zwenger and Himmelmann in *Chimaphila umbellata*, and by Claassen in 1870 from *Vaccinium vitis idaea*. Besides these, its presence has been indefinitely indicated in *Gaultheria procumbens*, *Epigea repens*, *Arctostaphylos glauca*, *Chimaphila maculata*, *Pyrola elliptica*, *P. chlorantha*, *P. rotundifolia* var. *asarifolia*, *Rhododendron maximum*, and *Kalmia angustifolia*. But in all these identification has not been definite, reliance has been placed solely on Jungmann's blue colour-reaction with phosphomolybdic acid in an alkaline solution; but this reaction is not specific and is given by other substances such as hydroquinone and toluquinone. In the determination of the amount of arbutin in bearberry leaves by the emulsin method of Bourquelot, it is important that the experiment should be conducted long enough to ensure the total action is complete, and the extracts employed should be purified before hydrolysis. The amount of arbutin indicated by this method is then 1·664 per cent. (See *Y.B.*, **1886,** 186, 239; **1887,** 169, 170; **1892,** 149, 192; **1893,** 145; **1895,** 125; **1896,** 126; **1898,** 75, 149; **1903,** 170.)

Areca Nut Fat. A. Rathje. (*Archiv. Pharm.*, **246,** 702.) Two extractions of fat were made from areca nuts, one with Et_2O, the other with petroleum ether. The former was a mottled reddish brown mass, with a fragrant nutmeg-like odour; the latter was yellowish white and almost odourless. The *ether extracted* fat has the following characters: Sp. gr. 0·884; m.p. 36–37°C.; saponification value, 227·4; acid value, 91·1; iodine value, 24·3; Reichert Meissl value, 0·2; acetyl value, 15·1. It contained a considerable quantity of a phytosterin and traces of alkaloids. The *petroleum ether extracted* fat had the sp. gr. 0·973; m.p. 37–38°C.; saponification value, 234·6; acid value, 97·2; iodine value, 12·3; Reichert Meissl value, 91·45; acetyl value, 18·2; it contained traces only of phytosterin and no alkaloids. The *ether extracted* fat contained the following percentages of fatty acids: Stearic acid, 2·25; palmitic acid, 3·1; myristic acid, 21; lauric acid, 43·65; capric acid, 1·0; oleic acid, 29 per cent. The *petroleum ether* fat gave the same acids in somewhat different proportions, with traces of caproic and caprylic acids.

Arsenic, Micro-chemical Reactions for, available for Forensic Purposes. G. Denigès. (*Comptes rend.*, **147,** 596.) The following methods are accurate, delicate, and can be obtained with a small amount of material. The results, once obtained and mounted, can be kept indefinitely and produced as evidence in a court of law. The results being very distinctive and crystalline, are more satisfactory as evidence than some of the amorphous stains sometimes relied upon. The presence of arsenium having been established, it is converted into the arsenic condition in the usual manner. A drop of this solution, not exceeding 5 mm. in diameter, is cautiously evaporated on a micro-slide held in the fingers over a small spirit lamp flame, so as to heat the outer zone of the liquid. When this is reduced to one-third, the slide is removed from the heat and evaporation allowed to proceed spontaneously. When quite cold, a drop of one of the following reagents is applied on a small glass rod, 3 or 4 mm. in diameter, with rounded ends, so that the drop of liquid does not extend beyond the edges of the dry residue, and forms a flattened meniscus over it. After standing for three minutes, the slide is then examined under the microscope without using a cover-glass. The external zone is first examined, for there the largest crystals will be formed. With 3 per cent. $AgNO_3$ solution containing 20 per cent. of N/7 or N/8 AmOH solution, red hexagonal rhombic or sometimes tetrahedral crystals, often grouped, are obtained in the presence of As. If the preparation be allowed to dry spontaneously, these crystals become more evident, and, being permanent, may be mounted for production as evidence. With a reagent of 3 per cent. $AgNO_3$ containing 10 per cent of acetic acid, branched crystals derived from rhomboid dodecahedra are more often obtained. Magnesium mixture gives cruciform crystals, or else fern leaf-like growths, resembling the crystals of magnesium ammonio-phosphate. To identify arsenical spots or rings obtained in the course of toxicological separation, these are dissolved in a few drops of hot, strong HNO_3, and the solution is cautiously evaporated almost to dryness in a minute capsule. More acid is added, and again carefully evaporated; the residue is finally dissolved in 0·1 c.c. or less of 10 per cent. HNO_3. This solution, treated as described above, will give distinct micro-reactions with less than 0·001 Mgm. of As_2O_3.

Arsenium, Occurrence of, in the Animal Organism. W. H. Bloemendal. (*Archiv. Pharm.*, **246**, **599**.) Under normal conditions, As does not occur in the animal body except in such infinitesimal traces that it can only be regarded as a foreign impurity, and can play no important physiological function. After the administration of arsenic, As may be detected in all the organs, arranged according to the amount of As found: Nails, hair, spleen, thyroid gland, skin, lungs, liver, kidneys, heart, bones, flesh, sexual organs, and brain. It may be found in the hair when it is not present in any other organ. In normal urine no As, or only barest traces, is present. After the administration of As_2O_3, it can soon be detected in the urine, but disappears in ten to twelve days. More As is excreted in human urine than in that of animals. Cacodylic acid is split up in the body into As_2O_3 or As_2O_5. These cannot be detected after giving atoxyl. As appears in human milk in extremely minute traces, and not at all in the milk of animals. After the administration of sodium cacodylate a trace of As is found in the form of gas in the body. This is not the case after exhibiting As_2O_3. (See also *Y.B.*, **1900,** 72.)

Artemisia cina, Essential Oil of. (*Schimmels' Report, November,* **1908,** 68.) Cineol is the chief constituent of oil of European wormseed; α-pinene, terpinene, terpineol, terpinenol, and a sesquiterpene are also present. (See also *Y.B.*, **1908,** 23.)

Artemisia herba-alba, var. densiflora, Essential Oil of. (*Schimmels' Report, April,* **1909,** 98.) The plant is known in Egypt as chieh, and yielded from the dried herb 1·6 per cent. of yellowish oil with an odour of thujone: sp. gr. 0·9192 at 15°C.; $\alpha_D - 5°20'$; $n_{D-20°}$ 1,45611; acid value, 1·5; ester value, 11; acetyl value, 40·7. (See also *Y.B.*, **1905,** 44.)

Artemisia lavandulaefolia, Essential Oil of. (*Schimmels' Report, April,* **1909,** 20.) The plant, indigenous to Java, yielded an oil having the sp. gr. 0·924 at 26°C.; $\alpha_D - 7°32'$. On cooling it deposits crystals having the molecular formula $C_{12}H_{14}O_2$.

Artemisia vulgaris, Essential Oil of. (*Haensel's Report, November,* **1908,** 25.) The yield, with steam under pressure, was 0·0263 per cent. of dark brown strongly aromatic oil; sp. gr. 0·9279 at 20°C. It appears to contain an aldehyde.

Asafetida. (*Evans' Analyt. Notes,* **1908,** 5.) Up to 20 per cent. of ash was found in several parcels of the commercial grade. Two samples of better quality contained 70·5 and 77·4 per cent. of alcohol soluble matter with 5·4 and 2·6 per cent. of ash respectively. (See also *Y.B.*, **1889,** 176; **1899,** 167; **1900,** 152, 153, 405; **1903,** 245, 342; **1908,** 24.)

Asarum canadense, Essential Oil of. (*Schimmels' Report, April,* **1909,** 85.) Two parcels of root gave oils having the following characters: Sp. gr. 0·9519 and 0·9520; $\alpha_D - 10°30'$. and $-10°42'$; $\eta_{D20°}$ 1,49987 and 1,48863; acid value, 4·7 and 3·1; ester value, 74·7 and 86·1; acetyl value, 125 and 125·8;

solubility in alcohol 70 per cent., 1 : 2·5 and 1 : 2·3. (See also *Y.B.*, **1908**, 25.)

Atoxyl and Arsacetine, Distinctive Reactions for. Labat. (*Répertoire*, **21**, 63.) In the following tests a ten per cent aqueous solution should be employed. A drop of *atoxyl* solution, on a micro-slide, treated with a 1 per cent. solution of $Co2NO_3$, $MnSO_4$, $NiCl_2$, or $MgSO_4$, forms minute foliaceous crystals; with $MnSO_4$ the precipitate is partially amorphous. *Arsacetine* solution gives amorphous precipitates with $CoSO_4$ and $MnSO_4$ and no precipitates with the other salts. Two drops of *atoxyl* solution mixed with 1 c.c. of alcohol, 95 per cent., gives a crystalline precipitate: *arsacetine* gives none. *Atoxyl* gives only a slight precipitate with an equal volume of 5 per cent. H_2SO_4: *arsacetine* affords a bulky precipitate. On mixing 1 c.c. of *atoxyl* solution with 0·5 c.c. of NaBrO reagent (NaOH solution, sp. gr. 1·332, 50 c.c.; Br, 5 c.c.; water, 100 c.c.) a red colour, permanent on heating, is produced: *arsacetine* solution gives no reaction until heated, when an orange brown precipitate is formed. One c.c. of *atoxyl* solution mixed with 2 drops of 1 per cent. $NaNO_2$ solution, 1 drop of 5 per cent. H_2SO_4 and 5 drops of AmOH, gives a red colour: no such reaction occurs with *arsacetine.* If 1 drop of Br solution is added to 1 c.c. of *atoxyl* solution a floating amorphous precipitate is formed in the orange liquid: with *arsacetine* the crystalline precipitate consists of fine tufts, readily seen under a low power. On heating 20 Cgm. of *arsacetine* with 10 c.c. of EtOH and of H_2SO_4 an odour of acetic ether is evolved: this does not occur with *atoxyl.*

Bakankosin, Further Notes on. E. Bourquelot and H. Hérissey. (*J. Pharm. Chim.* [6], **28**, 433.) The botanical source of the Malagasy *Strychnos* seeds which yielded the glucoside bakankosin (*Y.B.*, **1907**, 21) is traced to *S. vacacoua* and is synonymous with *S. bakanko*, and with *S. gerrardi* and probably with *S. baroni* also. A further supply of ripe fruits having been received from Madagascar, the seeds were found to contain the same glucoside, bakankosin, as was previously obtained from the unripe seeds. Neither the pulp nor the shell of the fruit contain glucosides hydrolized by emulsin; but the shell is rich in a reducing sugar. Bakankosin is soluble 8·05 : 100 in water at 20°C.; 1·74 : 100 in 95 per cent. alcohol; 24·5 : 100 in methyl alcohol; sparingly soluble in acetic ether.

It has the formula $C_{16}H_{23}O_8N + H_2O$. The products of hydrolysis have not yet been identified, but only one molecule of glucose is formed. Therefore the equation may be provisionally written

$$C_{16}H_{23}O_8N + H_2O = C_6H_{12}O_6 + C_{10}H_{13}O_3N \ (?)$$

Barosma pulchellum, Essential Oil of. (*Schimmels' Report, April*, **1909,** 95.) The leaves yield 3 per cent. of yellow essential oil, with a citronella odour, accompanied by a narcotic smell. The latter was due to an amorphous basic substance. Citronellal was isolated from the oil, freed from this volatile alkaloid. Besides this, methyl-heptenone, another undetermined ketone, dextro-menthone, isopulegol (probably a decomposition product of citronellal), dextro-citronellol, citronellic acid, and a trace of an undetermined phenol were present.

Beeswax. (*Evans' Analyt. Notes*, **1908,** 5.) *White.*—The twenty-five samples examined during the year afforded figures within the following limits :—

Acid Value.	Ester Value.	Specific Gravity.	Melting Point.
19·6 to 23·1	70·2 to 77·3	0·964 to 0·973	62° to 64° C.

Only one adulterated specimen was noted.

Yellow.—Eighty samples gave constants falling, in the main, within the commonly accepted limits. Three small consignments of different origin varied as follows :—

Geographical Source.	Acid Value.	Ester Value.	Sp. gr.	M. Pt.
Morocco	15·0	30·0	0·930	58° C.
Java	6·0	88·5	—	62° C.
Madagascar	19·0	79·0	0·966	64·5° C.

Three samples offered as genuine beeswax were adulterated with paraffin and stearin. A parcel offered on the London market as Barcelona wax gave :—

Acid Value.	Ester Value.	Sp. gr.	M. Pt.
13	43	0·934	60° C.

It was adulterated with paraffin. (See also *Y.B.*, **1892,** 112 ; **1903,** 195 ; **1905,** 46.)

Belladonna Extract (Green), Alkaloidal Value of. (*Evans' Analyt. Notes*, **1908,** 6.) Seven samples gave 0·4, 0·74, 0·6, 0·67, 0·96, 0·84 and 0·48 per cent. of alkaloid (as atropine).

Two samples of German extract contained only 0·1 per cent. alkaloid. (See *Y.B.*, **1886,** 265 ; **1887,** 241 ; **1892,** 218 ; **1901,** 178.)

Belladonna Leaves, Alkaloidal Value of. (*Evans' Analyt. Notes*, **1908,** 6.) From 0·25 to 0·53 per cent. of alkaloid (as atropine) was found. (See *Y.B.*, **1898,** 151 ; **1903,** 181 ; **1904,** 87 ; **1905,** 46.)

Belladonna Root, Alkaloidal Value of. (*Evans' Analyt. Notes*, **1908,** 6.) Of eighteen samples assayed, only one yielded less than 0·3 per cent. of atropine, whilst four gave less than 0·4 per cent. Nine samples of more satisfactory quality fell between 0·4 and 0·5 per cent., the highest figure reached being 0·6.

This, and similar drugs are difficult to sample accurately. Thus two different samplings of the same parcel gave 0·33 and 0·54 per cent. of alkaloid respectively. The powdered bulk of the same assayed 0·47 per cent. (See *Y.B.*, **1903,** 186 ; **1904,** 263 ; **1907,** 23 ; **1908,** 29.)

Belladonna and Hyoscyamus Extracts, Alkaloidal Assay of. E. Rupp. (*Pharm. Zeit.*, **53,** 737.) Three Gm. of belladonna extract, or 6 Gm. of hyoscyamus extract, is dissolved in about 5 to 8 Gm. of hot water in a 200 c.c. flask. When cold, Et_2O, 90 Gm., and solution of AmOH, 1 Gm., are added, and the mixture shaken up for 15 minutes. After allowing the Et_2O to separate, 60 Gm. of it is run through a plug of cotton wool into an Erlenmeyer flask and distilled on the steam-bath. The distillation residue is treated with three successive 5 c.c. of Et_2O, each being evaporated off separately ; it is then dissolved in a few c.c. of warm EtOH and 20 c.c. of N/100 acid are run in with an equal volume of water. If the acid solution be coloured, it must be transferred to a separator and shaken out with 5 to 10 c.c. of Et_2O. The Et_2O, when separated, must be washed twice with 10 to 15 c.c. of water, and these washings added to the original acid liquid. Enough Et_2O is then added to this to give a layer 1 Cm. deep ; the liquid is then titrated back with N/100 alkali, and with iodeosin indicator. If the acid alkaloidal solution be colourless when first obtained it may be titrated direct.

Benzoic Acid, Conversion of, into Salicylic Acid by Electrolysis G. Bargellini and G. Inghilleri. (*Rend. Soc. Chim. Rom.*, **6,** 333 ; *J.S.C.I.*, **28,** 146.) Benzoic acid in solution in acetic acid and water yields salicylic acid at between 50° and 60°C., with a current of 8 volts. Below 50° this acid is not formed, and about 60°C. a red resin appears.

Berberine, Microchemical Detection of, in Drugs. K. Bauer.

(*Pharm. Zentralh.*, **50,** 248.) Sections of the material are moistened on a slide for a few seconds with water : one drop of NaOH solution 1 : 10 and 4 or 5 drops of acetone are added, and the whole gently warmed. If berberine is present, crystals of acetone berberine will appear after a short time as brilliant greenish yellow scales.

Bergamot, Characters of Essential Oil of. E. Berté and G. Romeo. (*Annal. Lab. chim. Cam. comm. Messina, Schimmels' Report, April,* **1909,** 50.) Sp. gr. 0·880 to 0·887 at 15°C. ; α_D + 7° to + 25°, usually between + 10° and + 20°. Acid as acetic acid, 0·15 to 0·2 per cent. : in old oils up to 4 per cent. Esters, 33 to 44 per cent. ; evaporation residue, 5 to 6 per cent. ; soluble 2 : 1 in 90 per cent. alcohol ; most samples are soluble 1 : 1 in 80 per cent. alcohol, the latter solubility indicating oil of good quality. Boiling commences at 180°C. The first two fractions of 5 c.c. distilled from 30 c.c., distilled off under reduced pressure, should not show a marked difference in rotation ; and the mean rotation of the two should bear a definite relation to that of the original oil. The following are inferior grades of bergamot oil. (1) "*Nero di bergamotto*," obtained from unripe windfalls or "*bergamotella*." Odour somewhat unpleasant ; colour dark ; sp. gr. 0·890 to 0·896 ; esters 20 to 35 per cent. (2) *Distilled oil,* obtained from the marc by steam distillation ; sp. gr. about 0·865 ; esters, 2 to 6 per cent.

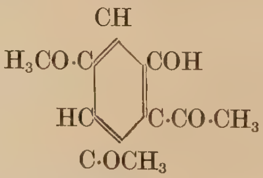
Bergamot, Solubility of Essential Oil of, in Alcohol. (*Schimmels' Report, November,* **1908,** 60.) The official solubility test of the Ph. Jap., which requires bergamot oil to be soluble 1 : 1·5 or 2 of alcohol 80 per cent., is too stringent, for genuine oils are not invariably soluble to this extent. At times it is impossible to obtain such oil.

Bismuth Hydroxide. O. Raubenheimer. (*Proc. Amer. Pharm. Assoc.*, **56,** 1010.) Bismuth subnitrate, 300 Gm., is mixed with distilled water, 200 c.c. ; nitric acid, 225 c.c., is added, and the bismuth dissolved, if needful, with gentle heat. The solution is filtered through cotton into distilled water 5,000 c.c., acidified with nitric acid 50 c.c. AmOH solution, 1,000 c.c., is diluted with distilled water, 12,000 c.c. ; the bismuth solution is poured quickly into it. 25 c.c. of nitric acid is diluted with 1,000 c.c. of water, and used to wash the vessel which has contained the bismuth solution, adding these washings to the bulk. The mixture is tested and more ammonia added if necessary to render alkaline. Allow to stand for 6 hours, then wash by decantation with distilled water. Collect, drain and dry at a temperature not exceeding 60°C. It is essential that the bismuth solution should be poured all at once, not slowly, *into* the ammonia solution, and not *vice versa*, as stated in most books.

Bismuth Subsalicylate, Preparation of. G. Heikel. (*Amer. J. Pharm.*, **80,** 585.) Metallic Bi, or $BiONO_3$, is dissolved in the smallest possible quantity of HNO_3. Into this solution, a solution of ammonium salicylate is added, in the proportion of rather more than 3 molecules of salicylic acid to every atom of bismuth. Salicylic acid at first precipitates, then combines with the bismuth. Ammonium salicylate solution is added until no further precipitation occurs. The precipitate is washed twice with cold water, then boiled with water, and washed with boiling water until the washings are free from acidity. The precipitate is then dried at a low temperature. The perfectly white bulky powder which should result answers all the requirements of the U.S.P., 1900.

Bitter Almonds, Essential Oil of, Benzylcyanhydrin of. K. Feist. (*Archiv. Pharm.*, **247,** 226.) Natural bitter almond oil obtained by steam distillation consists of racemic benzaldehyde-cyanhydrin with more or less benzaldehyde, the latter being a decomposition product.

Blumea balsamifera, Essential Oil of. R. Jonas. (*Schimmels' Report, April*, **1909,** 147.) The brown oil, from which a portion of the camphor (laevo-borneol) had probably been removed previously, had the following characters: Sp. gr. 0·950 at 15°C.; $\alpha_D -12°30$; acid value, 23·35; ester value, 1; acetyl value, 198. It contained cineol, limonene, borneol, laevo-camphor; sesquiterpenes and sesquiterpene alcohols, and a phenol identified as phloracetophenone-dimethyl-ether,



in colourless crystals; m.p. 82–83°C. It gives a deep red colour with Fe_2Cl_6.

Brucine and Strychnine, New Oxidation Products of. H. Leuchs. (*Berichte*, **41**, 1711.) By oxidizing brucine in acetone solution with $KMnO_4$, *brucinonic acid*, $C_{23}H_{24}N_2O_8$, m.p. 175°C., has been obtained, differing from the original base by containing 4 atoms more O and 2 atoms less H. By regulating the oxidation another acid, *dihydrobrucinonic acid*, $C_{23}H_{26}N_2O_8$, is obtained. Strychnine, under like conditions, yields *strychninonic* acid, $C_{21}H_{20}N_2O_6$, in colourless prisms, m.p., 265–267°C.; and dihydrostrychninonic acid, $C_{21}H_{22}N_2O_6$, m.p. 315°C., with decomposition. Strychninonic acid is not poisonous.

Brucine and Strychnine, Separation of, with HNO_3. A. B. Lyons. (*Amer. Drugg.*, **54**, 128.) The HNO_3 requisite for the destruction of brucine, sp. gr. 1·420 at 15·5°C., is stronger than the official U.S.P. acid (sp. gr. 1·403 at 25°C.). The latter may be used for the purpose thus: 1·5 c.c. of U.S.P. acid being gently heated with 1 to 2 Cgm. of powdered sugar until fumes are evolved, when 1·5 c.c. of water are added and the mixture cooled to the ordinary temperature. The solution of mixed alkaloids is added to this and the process continued according to the U.S.P. directions.

Burmese Black Wax, and certain Indian Dammars, Characters of. D. Hooper. (*Agric. Ledger*, **1908-1909** [3], 31.) The external nests of certain species of Indian stingless dammar bees of the genus *Trigona*, chiefly *T. laeviceps*, are built of a peculiar resinous wax, which is collected and sold under the name of "pwê-nyet." The inferior qualities are dark and brittle; the best kind from the Maulmain district is, when fresh, soft and light yellow in colour. It contains a little aromatic essential oil, which is lost on exposure, the wax becoming resinous and brittle. A specimen of the best kind had the following characters:—Moisture, 3·2 per cent.; ash, 0·3 per cent.: soluble in alcohol 86·2 per cent.; in ether, 72·2 per cent.; in petroleum ether 70·3 per cent.; acid value, 28·3; ester value, 23·9; iodine value, 137·1; m.p. between 70–80°C. The portion dissolved by alcohol is an amber-coloured resin, m.p. 90–100°C.; the insoluble portion is white and brittle, m.p. 190–200°C. The wax is not secreted by the bee, but is gathered from an unknown source. In order to trace this the characters of a number of Indian dammars and of *Canarium* resins were taken. The results with fresh authentic specimens were as follows:—

Kind of Dammar.	Solubility in Alcohol.	Acid Value.	Ester Value.	Iodine Value.
Dipterocarpus	96·2 per cent.	16·0	29·7	117·7
Hopea.	74·4 ,,	33·3	34·8	92·3
Vateria	57·3 ,,	35·4	46·1	62·2
Shorea	56·0 ,,	38·8	81·6	52·5
Canarium.	17·4 ,,	7·1	36·5	44·0

Among the Dipterocarpaceous resins the iodine value decreases with the solubility, but the saponification value rises. "Pwênyet" appears to occupy a position between *Dipterocarpus* and *Hopea* resins.

Butter, Detection of Artificial Colour in. R. W. Cornelison. (*J. Amer. Chem. Soc.*, **30**, 1478.) Ten Gm. of the melted fat is shaken out with 10 to 20 Gm. of glacial $HC_2H_3O_2$ at about 35°C. Separation quickly takes place, when the acid layer may be drawn off and tested. The following colours were obtained by adding acids to this acid extract:—

Added Colour.	Tint of Acid Extract.	Tint of Acid Extract + HNO_3.	Tint of Acid Extract + H_2SO_4.	Tint with H_2SO_4 and Et_2O to clear solution.
Pure butter .	Colourless	Colourless	Faint pink on standing	Colourless
Sudan I . .	Pink	Pink	Pink	Pink
Butter Gelb.	Very faint pink	Faint pink	Faint pink	Faint colour
Cerasin orange G.	Greenish yellow	Acid yellow; oil globule, pink	As with HNO_3	Brownish yellow
Yellow O.B..	Yellow	As above	As with HNO_3	Pink
Yellow A.B..	Slight ochre yellow	Pink; fat colourless	Brownish pink; fat faint pink	Pink
Annatto. .	Dull yellow	Little change	Faint pink on standing	Faint yellow
Curcumin .	Intense greenish yellow	Dull ochre yellow	Strong pink	Yellow
Carrot . .	Faint greenish yellow	Faint yellow	Faint pink on standing	Very faint yellow
"Alderney" Butter colour	Brownish yellow	Strong pink	Strong pink	—
Ranson's Butter colour	Yellow	Almost colourless	As with HNO_3	—
"Dandelion" Butter colour	Yellow	Almost colourless	As with HNO_3	—

Cacao Butter, Detection of Coconut Fat, Butter Fat, and Palm Oil in. F. Strube. (*Zeit. oeffentl. Chem.*, **14**, 67.) The test depends on the complete insolubility of cacao butter soap in NaCl solution, whereas the soaps of the other fats are incompletely precipitated. About 2·5 Gm. of the cacao butter is saponified by boiling with alcoholic KOH ; the alcohol is driven off, and the dry soap dissolved in 50 c.c. of hot water. When cold, 50 c.c. of saturated solution of NaCl is added ; the mixture is agitated frequently for 15 minutes, then filtered. A further 50 c.c. of saturated NaCl solution is then added to the filtrate. If the cacao butter be pure, the mixture remains clear or shows only the slightest opalescence. The fat from milk chocolate, under similar conditions, also remains clear. If after some time the mixture is again filtered, and the filtrate is acidified with HCl, the acid liquid will be clear if the original fat is cacao butter or contains ordinary butter fat. If it contains coconut oil or palm oil a further precipitate will result. The solutions will also have the characteristic odour of the fat with which the adulteration is made ; the presence of ordinary butter may be detected by the butyric odour of the acid liquid.

[The test would probably be useful for the examination of confectioners' "neat work," which is often adulterated with fats other than that of theobroma.—Ed. *Y.B.*]

Cacao Butter, Detection of Foreign Fats in. G. Halphen. (*J. Pharm. Chim.* [6], **28,** 345.) A solution of the fat in twice its volume of carbon tetrachloride is treated with a concentrated solution of bromine in the same solvent until a slight excess of bromine remains. The liquid, after filtering through a mixture of equal parts of sand and starch, is diluted with two to three times its volume of light petroleum ether, sp. gr. 0·700, and kept for two hours at 15° ; the formation of a precipitate or turbidity reveals the presence of foreign fat such as coconut fat. A preparation known as "beurre vert," which is a purified coconut fat, is much used on the Continent to adulterate cacao butter and chocolate ; this is readily detected by the above test. In the case of the latter, the fat is extracted in the usual manner by a suitable solvent ; and, if necessary, decolourized with animal charcoal, then tested as above.

Cade Oil, Reported new Constituent of. N. Lepeschkin. (*J. russ. phys. chem. Soc.*, **40,** 126), and J. Schindelmeiser (*ibid.* 181 ; *Schimmels' Report, November,* **1908,** 27). Lepeschkin has isolated from cade oil a new hydrocarbon, $C_{15}H_{24}$, differing from cadinene and the known sesquiterpenes and forming a liquid hydrochloride. It had the sp. gr. $\frac{20°}{4°}$ 0·9204; b.p. 262 to 266°C. under 760 mm., or 135°–140°C., under 20 mm. It gave no crystalline derivatives; when heated to 200°C. with HI it gave a sesquiterpene, possibly humulene.

J. Schindelmeiser considers this so-called hydrocarbon to be a mixture of the inactive sesquiterpene obtained by Troeger and Feldmann (*Y.B.*, **1898**, 480) and of cadinene; and the isomeride obtained by the action of HI to be a mixture of cadinene with tetra-hydrocadinene and the optically inactive sesquiterpene.

Caffeine, Determination of, in Coffee. K. Lendrich and E. Nottbohm. (*Zeits. Untersuch. Nahr. Genusm.*, **1909**, 269; *Apoth. Zeit.*, **24**, 218.) Twenty Gm. of finely-ground raw or roasted coffee are moistened with 10 c.c. of distilled water, and set aside for 2 hours if raw, or 1 hour if roasted. The moist powder is then transferred to a Soxhlet shell and extracted for 3 hours with CCl_4. One Gm. of hard paraffin is then added to the CCl_4 extract, the solvent is distilled off and the residue extracted with 50, 25, 25, and 25 c.c. of boiling water. The cold bulked aqueous extract is filtered and the filter washed. The filtrate is then treated with 10 c.c. of 1 : 100 $KMnO_4$ solution (for raw coffee), or 30 c.c. (for roasted coffee). After 15 minutes the Mn is precipitated by adding, drop by drop, H_2O_2 solution 3 : 100, containing acetic acid 1 : 100. The mixture is heated on the boiling water-bath, filtered, and the precipitate washed with boiling water. The filtrate is evaporated to dryness on the water-bath, and dried for 15 minutes at 100°C. The dry residue is then extracted with $CHCl_3$, the solution filtered, the solvent evaporated off, the residue dried to constancy and weighed as caffeine. Instead of evaporating the filtrate from the permanganate treatment, this may be directly shaken out with $CHCl_3$.

Calamus, Javan, Essential Oil of. (*Schimmels' Report, April*, **1909**, 24.) Two specimens of this oil were found to have different characters from the ordinary oil: sp.gr. 1·0783 and 1·0771 at 15°C.; a_D + 0°53′ and + 0°51′; η_D1,55043 and 1·55065. They were also more soluble in alcohol: 1 : 1·5 in alcohol 70 per cent. Ordinary calamus oil is only soluble in alcohol 90 per cent. (See also *Y.B.*, **1907**, 29.)

Callitris glauca, Essential Oil of. R. T. Baker and H. G. Smith. (*Schimmels' Report, April*, **1909,** 80; *Proc. Roy. Soc., N.S.W.*, **1908,** III.) The needles of Australian conifer, *Callitris glauca*, have yielded 0·6 per cent. of volatile oil containing 12 to 16 per cent. of bornyl and geranyl acetates; sp. gr. 0·8631 to 0·8782; a_D from + 22·7° to + 31·3°; η_D1,4747 to 1,4779. It also contains dextropinene, dextrolimonene and dipentene. The wood yielded a thick oil on distillation, which contained guaiacol and a new phenol, callitrol. The sandarac exuded by this tree is inferior to that of *Callitris calcarata*.

Calycanthus Alkaloids, Further Investigation of. H. M. Gordin. (*Proc. Amer. Pharm. Assoc.*, **56,** 805.) Continuing the investigation of *Calycanthus glaucus* (*Y.B.*, **1905,** 53; **1906,** 18), a second parcel of seeds has given another alkaloid, *isocalycanthine*, isomeric with calycanthin, $C_{11}H_{14}N_2$, but differing in its m.p., 212–214°C.; and not being capable of withstanding heating to 120°C. without decomposition. It slowly loses weight on drying over H_2SO_4, but this loss is probably not due to loss of water only. Its salts differ in m.p. and water content from the corresponding salts of calycanthine. A large number of those salts are described.

Camphene Hydrate, a New Borneol. O. Aschan. (*Berichte*, **41,** 1092.) When terecamphene hydrochloride, m.p. 148–149°C., is heated for 10 or 12 hours with milk of lime, it is converted into camphene hydrate, $C_{10}H_{17}OH$, which differs from borneol and isoborneol. Purified by sublimation, it forms white crystals, m.p. 150–151°C., b.p. 205°C. Its odour is musty and mint-like. It easily parts with a mol. H_2O when warmed with dilute mineral acids, or when boiled with acetic acid. It is probably a tertiary alcohol.

Capsicum, Detection of Small Quantities of, in Ginger Beverages. C. H. La Wall. (*Amer. J. Pharm.*, **81,** 218.) The following is a modification of the method of Garnett and Grier (*Y.B.*, **1907,** 443) for the detection of capsicum in ginger-flavoured beverages. About 250 c.c. of the beverage is gently heated to dispel CO_2. It is then rendered slightly acid with H_2SO_4 and shaken out with 50 c.c. of Et_2O. The Et_2O extract is evaporated spontaneously in a tared capsule and weighed. If 10 Mgms. or less, this quantity is dissolved in 2 c.c. of N/2 alcoholic

KOH. If the residue weighs more than 10 Mgm., 1 c.c. additional of N/2 alcoholic KOH is added for each 10 c.c. This solution is heated in a test tube under a reflux-tube condenser on the water-bath, so as to gently boil the alcohol for 30 minutes. The tube condenser is then removed and the alcohol is evaporated off. The residue is then dissolved in water, and the solution shaken out with ether. The ether extract is evaporated spontaneously. In the presence of capsicum, the ether residue will have the characteristic acrid pungent taste. When large quantities of ginger are present, a slight camphoraceous flavour may be perceived, but no pungency. One part of capsicum in 10,000 parts of water may be thus detected with certainty.

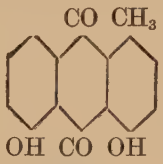
Caramel, Detection of, in Alcoholic Beverages [and Tinctures]. A. Jaegerschmid. (*Zeits Untersuch. Nahr. Genussm.*, **1909**, 269; *Apoth. Zeit.*, **24**, 218.) Wine or beer, 100 c.c., is well mixed, a little fresh white of egg and water, equal parts, and heated to coagulate the albumin. The coagulate is filtered out and the filtrate evaporated to a syrup on the water-bath. One half of this is extracted with ether, the other half with acetone. The residue obtained on evaporating the ether gives a cherry red colour with a freshly prepared solution resorcin 1 in HCl (sp. gr. 1·190) 100, in the presence of caramel. The acetone residue affords a carmine red colour with HCl (sp. gr. 1·190) under similar conditions.

Carapa procera, Fixed Oil of Seeds of. J. Lewkowitsch. (*Analyst*, **34**, 10.) The seeds were derived from Sierra Leone and were sent as "*Carapa guyanensis* Aubl," but were probably derived from *C. procera*. The species described by Aublet is *C. guianensis*, and is confined to the West Indies and South America. Therefore *Carapa guyanensis* Aubl., *C. guineensis* A. Juss, and *C. procera* de Cand are synonyms. Sound kernels yielded 24 per cent. of oil to cold pressure, and a further 27 per cent. was obtained. Extraction with ether gave 57·26 per cent. of oil. The cold pressed oil had the sp. gr. 40°/40°C., 0·9174; 15·5°/15·5°, 0·9272; solidifying point, 12°C.; m.p. 15–36°C.; saponification value, 197·1; iodine value, 75·67; Reichert Meissl value, 3·53. The hot pressed oil had the sp. gr. 40°/40°C. 0·9174, and 15°/15°C. 0·9327; solidifying point, 14°C.; m.p. 15–48°C.; saponification value, 196·4; iodine value, 71·25; Reichert Meissl value, 2·04. The characters of the insoluble fatty acids are also given. The oil is devoid of optical activity. Both oil and cake are very bitter. (See also *Y.B.*, **1908**, 41.)

Caraway, Essential Oil of, Adulterated. H. J. Henderson. (*Pharm. J.* [4], **28**, 610.) A specimen of "Ol. Carui Ang. B.P. 1898" has been met with containing 16 per cent. of castor oil.

Centaurea aspera, HCN in. C. Gerber and H. Cotte. (*J. Pharm. Chim.* [6], **28**, 322.) This plant is added to the list of those containing a cyanogenetic glucoside.

Chrysophanic Acid and Emodin, Constitution of. F. Tutin and H. W. B. Clewer. (*Proc. Chem. Soc.*, **26**, 208.) Investigations which are in progress show that the chrysophanic acid and emodin molecules have not the structure anticipated by Jowett and Potter (*Y.B.*, **1904**, 53). Chrysophanic acid does not contain a quinol grouping, but is probably 1-methylchrysazin.



Emodin is probably hydroxy-1-methylchrysazin, but the position of the additional OH group is, as yet, undetermined. These results, if confirmed, indicate the close relationship of chrysophanic acid to aloe-emodin and to rhein. (See also p. 7.)

Cinnamic Acid, Conversion of, into Styrolene by Moulds. R. O. Herzog. (*Zeits. physiolog. Chem.*, **57**, 43; *J. Pharm. Chim.* [6], **29**, 33.) It is pointed out that the action noted by Oliviero of certain moulds producing styrolene from cinnamic acid in Syrup of Tolu (*Y.B.*, **1907**, 286), which is confirmed by the authors, has an important bio-geological bearing, since it throws light on the formation of petroleum from fatty acids by means of micro-organisms. The occurrence of petroleum has been accounted for by geologists on purely physico-chemical grounds. This theory is not wholly satisfactory, and the degradation of aromatic and fatty acids by moulds and bacteria is an important biological process.

Cinnamon Bark, Characters of Essential Oil of. (*Schimmels' Report, April*, **1909**, 33.) The opinion is reiterated that the sp. gr. of "normal" oils varies from 1·023 to 1·040, and that lower densities may be due to the use of defective material or to unsuitable methods of distillation. (See also *Y.B.*, **1904**, 58; **1907**, 40; **1908**, 53.)

Cinnamon Bark, Seychelles, Essential Oil of. (*Schimmels' Report, November*, **1908**, 41.) Four specimens of Seychelles cinnamon bark oil, two from fresh and two from dried bark, varied in sp. gr. from 0·9465 to 0·9670.

Cinnamon Oil. (*Evans' Analyt. Notes*, **1908**, 11.) Some of the foreign cinnamon oils, although complying with the B.P. tests, contain added aldehyde, and probably leaf oil also. Such an oil had the following characters :—Sp. gr. 1·034; $a_D - 0°44'$. Aldehyde, 80 per cent. Phenols (Potash absorption method), 18 per cent.

On the other hand, many genuine oils fell within the following limits :—Sp. gr. 1·022 to 1·029. a_D to $-1°$. Aldehyde, 70 to 80 per cent. Phenols, 8 to 12 per cent. An exception to the above was found in a guaranteed pure English oil, which had the sp. gr. 1·036 and only contained 65 per cent. of aldehyde. Another commercial grade is represented by the following foreign oil, which possessed a fine mild odour :—

Sp. gr. 1·007. $a_D - 1°$. Aldehyde, 69 per cent. Phenols, 10 per cent.

Not soluble in 70 per cent. alcohol. This resembles oils distilled in Liverpool from the inner bark, which were also insoluble in 70 per cent. alcohol. These had a sp. gr. of closely 0·994, and contained from 50 to 55 per cent. of aldehyde. These light oils are free from the cassia-like odour which is occasionally noticed in distillates from chips of the whole bark. The official monograph for this oil requires extending and amending. (See also *Y.B.*, **1895**, 166; **1902**, 57, 58; **1904**, 58; **1907**, 40; **1908**, 53.)

Cinnamon Root Bark, Essential Oil of. A. A. Pilgrim. (*Pharm. Weekblad.*, **46**, 50; *Schimmels' Report, April*, **1909**, 35.) The fresh root bark of *Cinnamomum zeylanicum* yields a yellow camphoraceus oil, from which camphor separates at ordinary temperatures. Sp. gr. 0·9936 at 15°C.; $a_D + 50·2°$. It contains pinene, dipentene, phellandrene, cineol, camphor, eugenol, safrol, caryophyllene and borneol.

Codeine. D. B. Dott. (*Pharm. J.* [4], **27**, 108.) Details of suggestions for the revision and amplification of the official characters and tests for codeine are given.

Colchicum Corm, Assay of. A. B. Lyons. (*Amer. Drugg.*, **54,** 65.) Twenty-five Gm. of the drug, in moderately fine powder, is digested for 6 hours, with occasional stirring, at 50°C., with 15 c.c. of basic lead acetate solution (sp. gr. 1·235 at 25°C.) and 80 c.c. of water. The mixture is then transferred to a small funnel or percolator, and so packed that about 2 c.c. of percolate passes per minute. When drained, percolation is continued with successive 20 c.c. of warm water, until the total volume of percolate is 250 c.c. To this 5 Gm. of powdered Na_2HPO_4 is added, and the precipitated Pb_32PO_4 filtered out. One hundred c.c. of the filtrate (= 10 Gm. of drug) is shaken out with 25, 20, and 15 c.c. of $CHCl_3$. The bulked $CHCl_3$ is evaporated off in a tared capsule, the residue is evaporated several times with a little EtOH to remove adhering traces of $CHCl_3$, and finally dried to constant weight below 100°C.

If a volumetric method be preferred the following may be used. Twenty-five Gm. of the drug, as above, is macerated for 6 hours with 250 c.c. of a cooled mixture of $CHCl_3$ 1 vol., and Et_2O 4 vols. and 5 c.c. of AmOH solution 10 per cent. Then decant 100 c.c. of the clear liquid, distil it to dryness below 85°C. and evaporate the residue several times with a little EtOH to remove traces of $CHCl_3$. Dissolve the residue in 17 c.c. of 3 per cent. H_2SO_4, and add 8 c.c. of Mayer's solution, mix well, and filter through a dry filter. To 20 c.c. of the filtrate add 5 c.c. of N/10 KCN solution, then 4 c.c. of AmOH, and titrate the mixture to permanent turbidity with N/40 $AgNO_3$ solution. Note the number of c.c. used. Then take 5 c.c. of N/10 KCN, add 1 c.c. of AmOH and a few drops of KI reagent, and titrate as before with N/40 $AgNO_3$. The difference in the two titrations gives the excess of Mayer's solution in the 20 c.c. taken. Calculate this into the equivalent for 25 c.c., and deduct that amount from the 8 c.c. of Mayer's solution originally taken. The remainder = the number of c.c. of Mayer's solution precipitated by the alkaloid; 1 c.c. of this is equivalent to 0·0144 Gm. of colchicine. The above is a modification of Heikel's method. (See also *Y.B.*, **1880,** 159; **1891,** 196; **1900,** 117; **1904,** 66, 67, 350; **1907,** 35.)

Colchicum Seeds. (*Evans' Analyt. Notes*, **1908,** 14.) The B.P. Codex figure of 0·7 per cent. colchicine was not attained by any sample examined, the highest result recorded being 0·56 per cent. The equivalent of closely 5 per cent. of glucose was found adhering to the surface of the seeds in two lots examined. (See also *Y.B.*, **1902,** 171; **1904,** 66.)

Colocynth Seeds, Fixed Oil from. — Grimaldi and — Prussia. (*Boll. Chim. Pharm.*, **1909** [3]; *Pharm. Zeit.*, **54,** 281.) The seeds yield to CCl_4 17 per cent. of reddish yellow, slightly fluorescent, bitterish oil, with a faint odour. Sparingly soluble in EtOH; soluble in other organic oil-solvents; sp. gr. 0·9289; solidifying point, 14°C.; acid value, 2·7; saponification value, 191·7; Hehner value, 90·72; iodine value, 120·27; Reichert Meissl value, 0·32.

Copaiba, African, Essential Oil of. (*Schimmels' Report, November*, **1908,** 48.) A specimen of a dark brown fluorescent African copaiba balsam from London had the following characters: sp. gr. 0·9919 at 15°C.; $a_D - 2°15'$; acid value, 61·4; ester value, 7·1; not completely soluble in alcohol 98 per cent. It gave 46·5 per cent. of essential oil to steam distillation; sp. gr. 0·9215; $a_D + 22°26$; acid value, 2·2; ester value, 0; soluble 1 : 2 in alcohol 98 per cent., faintly opalescent with more; in alcohol 95 per cent. 1 : 10, with opalescence.

Copaiba, Essential Oil of, Adulterated. E. J. Parry. (*Chem. and Drugg.*, **74,** 270.) A mixture of oil of African copaiba and of gurjun oil in such proportions as to pass the physical requirements of the B.P. has been met with.

Copaiba Oleoresin. (*Evans' Analyt. Notes*, **1908,** 14.) Sixty consignments, mainly of direct importation, have been examined. Fixed oil, colophony, turpentine and African "balsam" were discovered in a few samples. Five yielded an oil to steam distillation, with the $a_D + 4°$ to $-3°$.

Some variation was again observed in the a_D of oils distilled from different varieties of balsam, as shown below.

Maranham, $-10°$ to $-20°$; Maracaibo, $-5°$ to $-9°$; Para, $-12°$ to $-20°$; Cartagena, $-17°$ to $-27°$.

A faint pink colour was occasionally developed by genuine oils with the official gurjun oil test. (See also *Y.B.*, **1900,** 160; **1901,** 140; **1905,** 68; **1907,** 49; **1908,** 57, 58.)

Copals from British West Africa. (*Bull. Imp. Inst.*, **6,** 24.) *Accra Copal from Ashanti.*—Yellowish white, flattened tears, with a vitreous fracture, mixed with small irregular pieces.

After scraping off the thin opaque outer surface, the interior is transparent. Sparingly soluble in turpentine and $CHCl_3$; about 75 per cent. dissolves in EtOH. Mixtures of equal volumes of EtOH and C_6H_6 and of EtOH and turpentine oil give practical solution. Acid value, 124; m.p. 180°C.

Copal from Sekondi, Gold Coast.—Of two samples differing somewhat in character one contained some water. Acid value, 133; m.p. 140–150°C. Completely soluble in alcohol-turpentine mixture; partly soluble in Et_2O; less readily dissolved in other solvents.

Sierra Leone Copal.—Two samples, of first and second grade respectively, were examined. The first was in tear-shaped, aromatic, fairly transparent lumps; acid value, 127; m.p. 127°C. The second was in smaller tears and contained several pieces of a different resin. The copal had the acid value 127; m.p. 125°C.; the foreign resin, acid value 102; m.p. 145°C. Both copals were partially soluble in organic solvents and in CG_2, and were completely soluble in a mixture of EtOH and C_6H_6.

South Nigerian Copal, said to be derived from *Cyananthos ogea*, differs slightly from the "ogea gum" previously imported. The copal occurs as a pale yellow vitreous mass with a faint terebenthous odour; acid value, 110; m.p. about 180°C.; insoluble in EtOH. "Ogea" gum has the acid value 116; m.p. about 120°C.; partly soluble in EtOH. The copal is soluble in a mixture of EtOH and C_6H_6, and of Et_2O and C_6H_6.

Resin of Daniella thurifera is stated to be derived from the same West African tree that furnishes Illurin copaiba. It occurs in small, translucent, yellowish fragments with a slight mastic-like odour. It melted at 90°C., much lower than the true copals, and was almost completely soluble in EtOH and in turpentine oil, as well as in mixed solvents. (See also *Y.B.*, **1904,** 202; **1907,** 50; **1908,** 61.)

Coriander, Terpeneless Essential Oil of. (*Haensel's Report, October*, **1908,** 11.) The main, if not sole constituent of terpeneless coriander oil is dextro-linalol.

Corydalis ambigua, Basic Constituents of. K. Makoshi. (*Archiv. Pharm.*, **246,** 381.) The alcoholic extract of the tubers of the Chinese *Corydalis ambigua* gave the following alkaloids: Corydaline, $C_{22}H_{27}NO_4$; natural dehydrocorydaline, forming a hydrochloride in yellow crystals, $C_{22}H_{24}NO_4{\cdot}Cl + 5H_2O$, very like berberine hydrochloride, but identical with dehydrocorydaline hydrochloride obtained from corydaline; an alkaloid forming a reddish brown crystalline mass, and a red crystalline hydrochloride, $C_{20}H_{18}NO_4 \cdot Cl$; and a second alkaloid crystallizing from ether in dense greyish white needles, m.p. 197–199°C. This m.p. is similar to that of bulbocapnine, but the new base does not behave like the latter with iodine, and differs from it in other reactions. Besides these, corybulbine and protopine were isolated. (See also *Y.B.*, **1905,** 69.)

Crithmum maritimum, Essential Oil of. F. Borde. (*Bull. Sci. Pharm.*, **16,** 132.) The leaves and stalks of samphire collected early in August yielded 0·3 per cent. and the fruits 0·7 per cent. of oil. Later in August, the respective yields were 0·15 and 0·8 per cent., and by the middle of September 0·154 and 0·7. The oil from the leaves and stalks is dark yellow, and heavier than water. That from the ripe dried fruits has the sp. gr. 0°/4°C. 0·950 to 0·980; α_D + 5°28′ to 8°15′; iodine value, 174 to 200; saponification value, 4 to 10; acetyl value, 3 to 4; soluble 1 : 6 in EtOH 90 per cent., 1 : 30 in EtOH 70 per cent.

Cyanogenetic Glucoside in Juncaginaceae. — Greshoff. (*Pharm. Weekblad.*, **45,** 181.) When distilled, the fresh plants of *Triglochin palustris*, *T. maritima* and *Scheuchzeria palustris*, HCN and acetone appear in the distillate. A glucoside allied to linamarin is probably present.

Cynoglossum officinale, Essential Oil of. (*Haensel's Report, October*, **1908,** 12.) The leaves yield 0·107 per cent. of dark brown oil with an odour like chamomile; sp. gr. 0·9412 at 20°; partially solidifying on cooling, soluble in EtOH 90 per cent.

Datura meteloides, New Alkaloid from. F. L. Pyman and W. C. Reynolds. (*Proc. Chem. Soc.*, **24,** 234.) *Datura meteloides* gives 0·4 per cent. of total alkaloids, of which 0·13 per cent. is hyoscine, 0·03 per cent. atropine, and 0·07 a new base meteloidine, $C_{13}H_{21}O_4N$, in tabular needles; m.p. 141–142°. It forms the hydrobromide $C_{13}H_{21}O_4N \cdot HBr + 2H_2O$, in needles m.p. 250°C.; the aurichloride $C_{13}H_{21}O_4N \cdot HAuCl_4 + \frac{1}{2}H_2O$, hexagonal plates m.p. 149–150°; and the picrate m.p. 177–180°C. It is optically inactive and has no marked physiological action. It is hydrolized by heating with $Ba(OH)_2$, forming tiglic acid and a new base teloidine, $C_8H_{15}O_3N$, thus:—

$$C_{13}H_{21}O_4N + H_2O = C_5H_8O_2 + C_8H_{15}O_3N.$$

Teloidine crystallizes from acetone in needles + 1 mol. H_2O. When rendered anhydrous at 120°C. it melts at 168–169°. Its salts are described. In general properties it resembles tropine and oscine.

Dichapetalum mossambicense, D. macrocarpum and Adenium coaetaneum: Poisonous East African Plants. M. Krause. (*Apoth. Zeit.*, **24,** 276.) The seeds of *Dichapetalum mossambicense*, var. *busseanum*, are very poisonous and contain a crystalline glucoside dichapetalin. The fruits of *D. macrocarpum*, although they are also poisonous, do not contain a glucoside which is soluble in water or alcohol. Their toxic principle has not yet been isolated. The stalks of *Adenium coaetaneum* and those of another undetermined species of *Adenium* both contain toxic crystalline glucosides.

Dill Herb, Spanish, Essential Oil of. (*Schimmels' Report, November*, **1908,** 49.) The bluish green oil has the sp. gr. 0·9062 at .15°C.; η_D 1,49185; soluble 1 : 3·4 of alcohol 90 per cent.; markedly dextro-rotatory. It contains dextro-α-phellandrene, terpinene, possibly dipentene or limonene, and carvone or dill-apiol.

Dimethyl Sulphide in Essential Oil of Geranium. (*Schimmels' Report, April*, **1909,** 55.) Dimethyl sulphide has been isolated from both Réunion and African geranium oil. It has previously been found in American peppermint oil.

Elaterin, Formula of. A. Berg. (*Comptes rend.*, **148,** 566; also *Seventh Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28,** 867.) Repeated cryoscopic experiments with elaterin, diacetylelaterin, elateridin and anhydroelateridin, confirm the formula $C_{28}H_{38}O_7$ originally attributed to it by the author, and not that of $C_{24}H_{34}O_6$ as stated by Hemmelmayr (*Y.B.*, **1907,** 54). On bromination it does not form only a monobromo-compound but also several amorphous bromo-addition products which cannot be easily separated. Anhydro-elateridin has the formula $C_{26}H_{38}O_7$, and not $C_{26}H_{36}O_6$, as at first found by Berg.

Elemi, African. (*Bull. Imp. Inst.*, **6,** 252.) *South Nigerian Elemi.* Botanical source undetermined. Two samples examined. One pale yellowish in colour; acid value, 55·3; saponification value, 71·9; essential oil, 8·1 per cent.; soluble in C_6H_6 and in turpentine oil. The other sample was greenish in colour; acid value, 37·8; saponification value, 46·2; percentage of volatile oil, 4·4 ; solubility similar to the first. Both were but sparingly soluble in cold alcohol. The essential oil of the first sample was pale yellow ; sp. gr. 0·8686 ; α_D + 50°30′ ; it contains much phellandrene.

Uganda Elemi.—From *Canarium schweinfurthii.* Varying in colour from white to pale yellow ; acid value 29·4 ; saponification value, 44·8 ; percentage of volatile oil, 11·2 ; entirely soluble in C_6H_6, in turpentine and EtOH, and in C_6H_6 and EtOH ; sparingly soluble in EtOH alone. The essential oil had the sp. gr. 0·8451 and the α_D + 79°20′. (See also *Y.B.*, **1904,** 67, 77, 95 ; **1905,** 71 ; **1907,** 54 ; **1908,** 75.)

Elemi. (*Evans' Analyt. Notes*, **1908,** 16.) A sample of the African variety gave acid value, 27·1 ; saponification value (hot), 42·6 ; ash, 0·2 per cent. ; loss at 100°C., 13 per cent. Two samples of Manila elemi gave acid value, 22 and 21 ; saponification value (hot), 31 and 31·5.

Elemi, Manila, Essential Oil of. F. W. Semmler. (*Berichte*, **41,** 1768, 1918, 2183, 2556 ; *Schimmels' Report, November*, **1908,** 50.) Besides dextrophellandrene and dipentene, and a sesquiterpene alcohol, elemi oil contains a new phenolic ether, elemicin, allyl-trimethoxy-3-4-5-benzene. It is converted into iso-elemicin by boiling over Na, or with KOH. Both elemicins yield trimethylgallic acid when oxidized with $KMnO_4$. Other oxidation products are described and the structure of the molecule is discussed at length.

Emulsin in Gums. Volcy Boucher. (*Bull. Sci. Pharm.*, **15,** 394.) All the true gums examined contained an emulsin ferment capable of hydrolizing amygdalin. Soluble gums are more active in this respect than insoluble : in gum resins, the activity is proportional to the amount of gum present. Tanno-gums, act slowly, the tannin retarding the hydrolysis. Kino is an exception ; the specimen examined showed no action on amygdalin. Possibly heat had been used in its preparation, thus destroying the enzyme. True resins contain no ferment. The tanno-gum of *Moringa pterygosperma* contains myrosin as well as emulsin.

Ergot, Fixed Oil of. A. Rathje. (*Archiv. Pharm.*, **246,** 696.) Ergot yields a dark brown oil with a slight characteristic odour, and a faint acrid taste ; sp. gr. 0·9250 ; η_D 1,4685 ; saponification value, 178·4 to 180·2 ; acid value, 11·31 to 11·46; iodine value, 73·4 to 74·5; Hehner value, 95·84 to 96·6; Reichert Meissl value, 0·61 to 0·67; acetyl value, 27·43 to 31·38. The oil contained 0·6 per cent. of alkaloids. The bases consisted of a brown resinoid mass with an intense odour of pyridine. The constitution of the oil was found to be: Oleic acid, 68; oxyoleic acid, 22; palmitic acid, 5; unsaponifiable matter, 0·35; ash, 0·2; alkaloids, 0·6; glycerin, 7·5 per cent. The physical constants of the fatty acids are also given.

Ergot, Method of Chemical Valuation of, with Benzol. H. C. Wood, junr. (*Amer. J. Pharm.*, **81**, 215.) A definite relationship exists between the therapeutic value of ergot and the amount of the C_6H_6 extract present in the official fluid extract of the drug. Ten c.c. of the fluid extract is diluted with 20 c.c. of water, and shaken out with successive 10 c.c. of C_6H_6 until that solvent is no longer coloured. The C_6H_6 is evaporated off, dried to constancy and weighed. A series of thirteen experiments shows that the amount of C_6H_6 extract obtained closely coincides with the physiological index in practically all cases. The two most active preparations had a physiological index of 33 and 32, with 0·68 and 0·58 per cent. of C_6H_6 extract respectively. The others show a gradually diminishing figure for both, until finally two which were physiologically inert gave only 0·09 and 0·06 per cent. of C_6H_6 extract. This substance is a golden yellow resinoid, insoluble in dilute acids and in petroleum ether. It resembles Jacoby's sphacelotoxin (*Y.B.*, **1898,** 167) in characters and colour reactions. Fluid extracts which had been kept exposed to air were found to deteriorate both in physiological activity and in percentage of C_6H_6 extract.

Eriodictyon, Further Chemical Examination of. F. Tutin and H. W. B. Clewer. (*Proc. Chem. Soc.*, **25,** 12.) In addition to eriodictyol and homoeriodictyol, Tutin and Power (*Y.B.*, **1907,** 63) isolated a third crystalline substance in small quantity to which the formula $C_{16}H_{12}O_6$ was assigned. Working on more material the authors have further examined this last body, which they name *chrysoeriol.* It forms golden yellow leaflets not melting at 337°C. It contains three HO groups. Besides this, *xanthoeridol*, $C_{18}H_{14}O_7$ in yellow crystals, m.p. 258°C., and *eriodonol*, $C_{19}H_{18}O_7 + H_2O$, in pale yellow needles, m.p. when hydrated 199°C., when anhydrous 209°C., were isolated.

Erytaurin, a New Glucoside from Erythraea centaurea. H. Hérissey and L. Bourdier. (*J. Pharm. Chim.* [6], **28,** 178, 252.) When submitted to the action of emulsin, the alcoholic extract of *Erythraea centaurea* shows considerable optical deviation, becoming dextro-rotatory, although originally laevo-rotatory, thus indicating the presence of a glucoside. This has been isolated in a crystalline condition by means of neutral solvents. It has characters distinct from other known glucosides, and has been named erytaurin. Its a_D equals $-131{\cdot}6$ to $131{\cdot}8$.

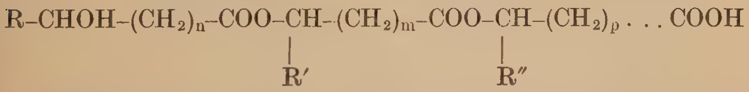
Erythrophloeum couminga Bark. L. Planchon and E. Laborde. (*J. Pharm. Chim.* [6], **28,** 220.) *Erythrophloeum couminga* is a shrub growing in the Seychelles and on the western coast of Madagascar. The bark occurs in irregular fragments 10 to 15 cm. long and 3 to 6 cm. broad, and is about 2 cm. thick. Its colour is dull red, and like *E. guineense*, the infusion is of the same colour, hence the latter is known as "red water tree." The fracture is short, gritty, and the section hard and red. It sinks in water. It has but little odour, yet occasions sneezing. The taste is at first astringent, then bitter, and causes tingling of the tongue. It shows masses of yellow sclerenchyma distributed in the periderm and in the liber. The liber contains many flattened sieve tubes. The bark is as intensely poisonous as that of *E. guineense*, and contains about 0·5 per cent. of erythrophleine.

Essential Oils containing Anethol, Evaporation Residues of. (*Schimmels' Report, November*, **1908,** 70.) Oils such as fennel, and anise oil, and anethol itself, leave very considerable residues on evaporation on the water-bath. The high b.p. of anethol renders it slowly volatile, and it is easily polymerized when it becomes quite non-volatile. Thus anethol gave 36 per cent. of residue after 4 hours' evaporation, and 9·8 in 16 hours. Any evaporation test applied to such oils is, therefore, fallacious.

Essential Oils, Reaction of, with Phloroglucinol Hydrochloride. R. Kobert. (*Répertoire*, **21,** 73.) One part of phloroglucinol is dissolved in 10 parts of EtOH; to each c.c. of this solution a few c.c. of HCl are added. A drop, or a small particle of a solid, is added to 1 c.c. of this reagent. Linalol, eugenol, safrol, myristicol, methyl-chavicol, apiol, geraniol, and cinnamic aldehyde give an intense red colour. All these contain the allyl-group, $\cdot CH_2{\cdot}CH:CH_2$, or a modification thereof. Isosafrol and iso-myristicol, containing instead the propenyl group $CH : CH{\cdot}CH_3$, do not give the reaction. Essential oils of mustard, cloves, pimento, dill, neroli, jaborandi, tarragon, basil, lavender, Peruvian balsam, parsley and sassafras, all give a bright red colour. Oils of bergamot, anise, eucalyptus, curled mint, rosemary and citronella give a brownish red reaction. Many other oils give a dull red or dirty white colour. American peppermint becomes dull red on warming; Japanese mint, yellow; Mitcham mint, pale red, or when terpeneless, dull red. Natural oil of scurvy grass shows a brown reaction, the synthetic oil a whitish turbidity.

Ether, Purification of. G. Garbarini. (*Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28,** 869.) H_2O_2 is a universal impurity in Et_2O which has been exposed to light and air. Fe2(OH) is found to be effective in removing this: $FeSO_4 7H_2O$ and CaO, both in powder, are mixed. The water of crystallization allows reaction to proceed, or a trace of water may be added. The greenish mass obtained must be protected from oxidation. From 1 to 2 per cent. of this, left in contact with the Et_2O for 24 hours completely removes H_2O_2.

Etholides, a New Class of Bodies in Coniferous Waxes. J. Bougault and L. Bourdier. (*J. Pharm. Chim.* [6], **29,** 561.) The waxes obtained from the leaves of *Juniperus sabina*, from the berries and leaves of *J. communis*; and from the leaves of *Picea excelsa*, *Pinus sylvestris* and *Thuja occidentalis* all contain definite complex bodies composed of the union of molecules having simultaneously acid, ester and alcoholic functions, as represented by the formula:—



$$R\text{–}CHOH\text{–}(CH_2)_n\text{–}COO\text{–}\underset{\underset{R'}{|}}{CH}\text{–}(CH_2)_m\text{–}COO\text{–}\underset{\underset{R''}{|}}{CH}\text{–}(CH_2)_p \ldots COOH$$

The wax was obtained by extracting the fresh bruised material with boiling 80 per cent. alcohol. On cooling the fine green needles formed were collected, washed with ether, and recrystallized many times from alcohol 95 per cent. until a white product was obtained. A number of fractions of various m.p.s were collected, many evidently mixtures. Ultimately sufficient of one, m.p. 82°C., was obtained for investigation. The wax of *Juniperus sabina* contains etholides melting around 68°, 72°, 76° and 82°C. The products of saponification of these etholides are wholly acid alcohols. Two of these have so far been isolated and prove to be new: *juniperic acid*, $C_{16}H_{32}O_3$, m.p. 95°C., an oxypalmitic acid; and *sabinic acid*, $C_{12}H_{24}O_3$, m.p. 84°C., an oxylauric acid. The investigation is proceeding.

Ethyl Ester Value, a new Factor for Fat Analysis. —Hanúš and Stekl. (*Zeits. Untersuch Nahr. Genussm.*, **1908** [16]; *Pharm. Zeit.*, **1908, 53,** 589.) Five Gm. of butter or other fat is accurately weighed off and saponified with 30 c.c. of alcoholic N/10 KOH solution. The liquid is neutralized with H_2SO_4, freely diluted with water and distilled. The first 30 c.c. of the alcoholic distillate is collected apart, then 100 c.c. of aqueous distillate. The latter is saponified with excess of N/2 KOH and titrated back with N/2 HCl. The amount of KOH used up by the ethyl esters in this 100 c.c. of aqueous distillate from 5 Gm. of fat, expressed in terms of N/10 KOH gives the new number. Coconut fat gives a high ethyl ester value, over 40; butter between 7·1 and 13; palm oil, 23; margarine, 1·3 to 3; lard, 2·7 to 3·2; cacao butter, 1·3 to 1·6; almond, olive, and sesame oils, under 2.

Eucaine, α- and β-, Distinctive Test for. C. Gaudussio. (*Pharm. Post*, **41,** 825.) On adding 2 drops of solution of I in KI to 2 c.c. of β-eucaine, a slight brown precipitate is formed in 15 minutes, and the liquid remains clear. With α-eucaine the reddish brown precipitate formed becomes yellow in 1 or 2 hours, and the liquid becomes lemon colour.

Eucalyptus Oil, South African. (*Evans' Analyt. Notes*, **1908,** 16; and E. F. Harrison, *Pharm. J.* [4], **28,** 4.) A sample of eucalyptus oil from the Transvaal was examined towards the end of the year. It compared favourably with the Australian oil, and gave sp. gr. 0·9224 α_D + 3°30′; cineol, 70·7 per cent.; phellandrene absent. The oil was soluble in three volumes of 70 per cent. alcohol. A specimen of oil of practically identical characters yielded Harrison (*loc. cit.*) 83·7 per cent. of cineol.

Eucalyptus rudderi, Essential Oil of. R. T. Baker and H. G. Smith. (*Schimmels' Report, November*, **1908, 67.**) The yield from the fresh leaves and twigs is 0·309 per cent. of reddish brown oil; sp. gr. 0·942; α_D—8·5°; $\eta_{D20°}$ 1,4898; soluble 1:1 by weight of alcohol 80 per cent. It contains no phellandrene, 5 per cent. of cineol, practically no pinene. Aromadendral is present.

Eupatorium rebaudianum, Further Examination of. K. Dieterich. (*Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28,** 836, and *Apoth. Zeit.*, **24,** 404.) In addition to the sweet principle eupatorin (*Y.B.*, **1908,** 78), which is about 150 times sweeter than sugar, another amorphous glucoside, rebaudin, has been isolated, which is even sweeter. The leaves also contain resin, bitter principle, oil, and wax. The small proportion in which these bodies exist, and the difficulty in isolating them pure, precludes them at present from being of commercial value.

Fagara xanthoxyloides, Constituents of Root Bark of. H. Priess. (*Apoth. Zeit.*, **24,** 186.) The main constituents of the drug are the same as those found by Giacosa and Morani in Artar root from *Xanthoxylon senegalense* (*Y.B.*, **1888,** 131; **1890,** 150). A new alcohol, fagarol, $C_{14}H_{14}O_4$, m.p. 126·5°C., was isolated from the petroleum ether extract, which also contains the two alkaloids found in artar root. The fixed oil, freed from these bases, had the acid value 18·35; ester value, 132·1; iodine value, 101·7.

Formic Acid, Detection and Determination of Small Quantities. F. Schwarz and O. Weber. (*Zeit. Untersuch. Nahr. Genussm.*, **1909,** 196; *Apoth. Zeit.*, **24,** 177.) Under the names of "Fructol" and "Wederol," formic acid is widely used as a preservative for fruit juices and syrups. It may be detected in the presence of acetic acid as follows. Fifty or 100 Gm. of the liquid is distilled with live steam until 250 c.c. of distillate has been collected. This is titrated with N/10 NaOH, evaporated to dryness, and redissolved in 20 c.c. of water. To this solution 30 c.c. of an oxidation solution ($K_2Cr_2O_7$, 12 Gm.; H_2SO_4, 30 c.c.; water, 100 c.c.) is added, and the mixture is heated to gentle boiling for 10 minutes under a reflux condenser. This decomposes formic acid but leaves acetic acid unaffected. After cooling the solution is again steam distilled until 250 c.c. of distillate has been collected, and titrated as before; the difference in the two titrations gives the amount of $HCHO_2$. 1 c.c. of N/10 NaOH = 0·0046 Gm. $HCHO_2$. (See also *Y.B.*, **1908,** 82.)

Gelsemium sempervirens, Further Study of the Alkaloids of. L. E. Sayre. (*Proc. Amer. Pharm. Assoc.*, **56,** 851.) The so-called gelseminine of F. A. Thompson (*Y.B.*, **1887,** 61) appears to be a mixture of gelsemine tenaciously combined with a resinoid colouring matter of doubtful alkaloidal character; the different colour reactions attributed to gelsemine and gelseminine are possibly due to this colouring substance. Thompson's "gelseminine" affords small quantities of white crystalline gelsemine when treated with toluene containing a little alcohol. Amorphous "gelseminine" is markedly more toxic than crystalline gelsemine, in fact, possibly the former owes its toxicity to traces of the latter, although hitherto gelsemine has been considered to be the active principle of the drug.

Ginger, Powdered. (*Evans' Analyt. Notes*, **1908, 17.**) Five lots of powdered Jamaica ginger ground in Liverpool gave the following figures :—

Cold Water Extract.	Ether Extract.	Alcohol Extract.	Ash.
15·7 per cent.	3·75 per cent.	5·65 per cent.	2·65 per cent.
12·3 ,,	3·3 ,,	6·3 ,,	2·90 ,,
16·95 ,,	3·8 ,,	7·6 ,,	4·00 ,,
15·05 ,,	4·0 ,,	6·45 ,,	4·05 ,,
13·85 ,,	5·3 ,,	7·65 ,,	4·10 ,,

Glycerin, Aldehydic Impurities in. G. F. Bergh. (*Apoth. Zeit.*, **23,** 689.) Most commercial glycerin contains traces of reducing bodies derived from acrolein, which does not exist in the free state, but combined with glycerol. Acrolein and glycerol unite in equimolecular proportions, the compound having the characters of an acetal and has been named *glycerinacrylal.* It does not reduce Fehling's solution, and reduces ammoniacal $AgNO_3$ with difficulty. It is slowly dissociated in presence of water, more readily under the influence of heat and of dilute acids. It has practically no odour, so that its presence in small quantity is not detectable by the smell, nor by the ammoniacal $AgNO_3$ test. It may be revealed by fuchsine-sulphurous acid reagent, or after liberating the acrolein by heating with dilute H_2SO_4, by its reducing action on Fehling's reagent.

Glycerin, Detection of Traces of. G. Denigès (*Comptes rend.*, **148,** 570.) Exactly 0·3 c.c. of Br is dissolved by agitation in a stoppered flask with 100 c.c. of distilled water. Not more than 1 c.c. of a 1 : 10 solution of glycerin is treated with 10 c.c. of this Br solution, and heated for 20 minutes in a boiling water-bath, then boiled until all free Br is driven off, and allowed to cool. To this solution (G) the following reactions are applied: Place the following alcoholic solutions into four test tubes, codeine 1 : 20; resorcin 1 : 20; thymol 1 : 20; β-naphthol 1 : 50. To the codeine solution add 0·2 c.c. of (G) and 0·2 c.c. of water; into the other tubes 0·4 c.c. of (G) only. Then to each add 2 c.c. of strong H_2SO_4, shake and plunge the codeine and β-naphthol tubes for 2 minutes in the water-bath. With codeine, a fine blue-greenish colour, showing a strong absorption band in the red, is formed; with β-naphthol an emerald green colour and green fluorescence, with two absorption bands, in the green and red. With resorcin, a blood-red colour yellowish on dilution with $HC_2H_3O_2$ or H_2SO_4 and two absorption bands, in the blue and yellow. With thymol a vinous red, pink on dilution. Introduce into two test tubes 0·1 c.c. of KBr solution 1 : 25, 0·4 c.c. of (G) and 0·1 c.c. of a 1 : 20 alcoholic solution of salicylic acid in one mixture and of guaiacol in the other; then to each add 2 c.c. of H_2SO_4 and heat for 2 minutes in the water-bath. The salicylic acid mixture will show an intense reddish violet colour, giving two absorption bands, in the yellow and blue. The guaiacol mixture will be deep blue, with an absorption band in the red. Dissolve 1 c.c. of phenyhydrazine in a mixture of 4 c.c. of $HC_2H_3O_2$ and 20 c.c. of a 1 : 10 solution of $NaC_2H_3O_2$. Mix equal volumes (0·5 c.c.) of this and (G), heat for 20 minutes in the water-bath, then cool for an hour. The yellow precipitate of glycerosazone which will have formed consists of microscopic flexile radiating needles and rounded granules. Distil a mixture of 5 c.c. of (G) and 1 c.c. of H_2SO_4, so as to obtain 1·5 to 2 c.c. of distillate. To this add an equal volume of the above phenylhydrazine reagent. A precipitate will form in the cold, becoming crystalline in 30 minutes, and consisting of masses of micro-stellate crystals of methylglyoxalosazone. Equal volumes of (G) reduce Nessler's and Fehling's solutions in the cold.

Glycerophosphates, Acid. P. Carré. (*Bull. Soc. Chim.* [4], **5**, 109.) The author states that pure barium acid glycerophosphate cannot be obtained, as stated by Self [*Y.B.* **1908,** 86] by the action of H_2SO_4 on neutral barium glycerophosphates, until neutrality to helianthin results; since, under these conditions, the acid barium glycerophosphate formed is partially decomposed into the neutral salt and free glycerophosphoric acid, as shown by himself (*Bull. Soc. Chim.* [3], **31**, 805).

Glycyrrhizinic Acid, Further Researches on. A. Tschirch and S. Gauchmann. (*Archiv. Pharm.*, **246,** 545, 558.) Continuing the work on glycyrrhizinic acid previously recorded by Tschirch and Cederberg (*Y.B.*, **1907,** 73) the authors have investigated the hydrolysis products. Among these glycyrrhetic and glycuronic acids have been definitely isolated, the latter is found in the vegetable economy for the first time.

Examining other plants for glycyrrhizin, it has been found in the root of *Periandra dulcis.* Monesia bark from *Pradosia lactescens* contains a sweet principle which, although having certain properties in common with glycyrrhizin, is not identical therewith. It appears to be a dihydrated form, $C_{44}H_{64}O_{19} + H_2O$. The root of *Abrus precatorius* and the rhizome of *Polypodium vulgare* do not contain glycyrrhizin. (See also *Y.B.*, **1908,** 241.)

Glucosides, Cyanogenetic. E. Bourquelot. (*Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28,** 689.) Phaseolunatin or linamarin is the only cyanogenetic glucoside at present known which yields acetone on hydrolysis; several yield benzoic aldehyde, and one, dhurrin, yields para-oxybenzoic aldehyde. Those which yield benzoic aldehyde may be arranged in two groups; the first comprises amygdalin and iso-amygdalin, which yield two molecules of glucose on hydrolysis, and the second comprises Fischer's amygdonitrile-glucoside, prulaurasin, and sambunigrin, which give only one molecule of glucose; these appear to be intermediate products representing the results of partial hydrolysis of members of the first group. All these may be further classified according to the products of their hydrolysis by means of strong HCl; when hydrolysis is brought about in this way phenylglycollic acid is produced, which is lævo-rotatory from amygdalin and amygdonitrile-glucoside, inactive from iso-amygdalin and prulaurasin, and dextro-rotatory from sambunigrin. The relations existing between these different bodies is thus rendered clear, and a corresponding relationship probably exists among glucosides yielding para-oxybenzoic acid and those yielding acetone, indicating the possible nature of a number of bodies yet to be discovered.

Gouty Deposit, Cholesterolin. Malthes and Ackermann. (*Pharm. Zentralh.*, **50,** 214). Cholesterol amounting to 6·87 per cent. of the total dry substance has been recorded as a constituent of a large whitish gouty concretion; besides this, 76·72 per cent. of sodium urate was present. The ash, comprising 11·6 per cent. of the fresh material, gave 92·3 per cent. of Na_2CO_3 and 4·8 per cent. of NaCl.

Guitzeit's Tests, Apparatus for. P. B. Dallimore. (*Pharm. J.* [4], **28,** 324.) A compact form of apparatus is figured and described.

Gurjun "Balsam," Essential Oil of. (*Schimmels' Report, April,* **1909,** 57.) The oleoresin, imported as "Cochin wood oil," yielded 69·9 per cent. of lemon yellow oil, $\alpha_D - 61°48'$; sp. gr. 0·9248; $\eta_{D20°}$ 1,50252; acid value, 0; ester value, 1·6; soluble 1 : 9 in 95 per cent. alcohol. At ordinary pressure 86 per cent. distilled between 260–265°C., and 6 per cent. between 265–269°C.

Helichrysum angustifolium, Essential Oil of. (*Schimmels' Report, April,* **1909,** 57.) The oil, distilled in Hungary, had the sp. gr. 0·9084 at 15°C.; α_D + 4°25; $\eta_{D20°}$ 1,47450; ester value, 134; soluble in 85 per cent. alcohol 1 : 6 to 1 : 7.

Helichrysum angustifolium, Nerol in Essential Oil of. — Heine. (*Chem. Tech. Repert.*, **33,** 295.) Nerol, $C_{10}H_{18}O$, is much used in the preparation of "synthetic" rose oil; but hitherto a profitable source has not been available. It occurs in lignaloe, rose, neroli, and petitgrain oils, but only in small quantity. In the essential oil of *Helichrysum angustifolium*, however, large quantities occur, equivalent to 40–65 per cent., of neryl acetate. The oil is therefore a good source of the alcohol. Several methods for its isolation are the subject of a German patent.

Hordenine, Reactions of, Based on its Constitution. G. Denigès. (*Bull. Soc. Chim.* [4] **3,** 786.) A drop of a 2 or 3 per mille solution of a hordenine salt, on a micro-slide, when treated with a drop of iodine reagent [I, 6; KI, 8; H_2O, 150] gives in about 1 minute very characteristic brownish yellow crystals. The reaction occurs with a dilution of 0·05 Gm. of the base per litre; and is evident in a drop containing only 0·0005 Mgm. The reaction is due to the presence of trimethylamine in the molecule of hordenine. If to 2 c.c. of a solution of a hordenine salt, 2 drops of formalin solution and 2 c.c. of pure H_2SO_4 are added, and the mixture is boiled, a fine green colour is gradually formed. The reaction is due to the presence of an oxycresylic radicle. Tyrosine gives a similar reaction. but more slowly, and the green tint is browner. By modifying the test as follows hordenine may be readily distinguished from tyrosine. Two or 3 Cgm. of the base, or of its salts, is dissolved with heat in 4 c.c. of glacial $HC_2H_3O_2$ and 4 drops of formalin, 3 c.c. of H_2SO_4 is then added to the boiling liquid and the mixture is shaken. With hordenine, a green colour quickly appears; with tyrosine, the colour is red, gradually changing to dull green. On adding a single drop of paraldehyde to a trace of hordenine solution previously mixed with 4 c.c. of H_2SO_4, and shaking, a red colour is obtained, evident with 0·2 Mgm. of the base. A 1 per cent. solution of hordenine, when treated first with 5 or 6 c.c. of Cl solution, then with 5 or 6 drops of AmOH, gives a more or less intense yellow colour.

Hordenine, Reaction of, with Urotropine. A. Labat. (*J. Pharm. Chim.* [6], **29**, 433.) One c.c. of aqueous 1 : 100 solution of hordenine sulphate, when mixed with 1 c.c. of a 1 : 100 solution of urotropine, and 2 c.c. of H_2SO_4 and boiled, quickly shows a fine emerald green tint. The colour is evident in the presence of 0·1 Mgm. of hordenine sulphate. Inversely the hordenine sulphate solution may be used as a reagent for urotropine, which it will detect in a dilution of 1 : 1,000. The reaction is due to the action of the formaldehyde derived from the decomposition of the hordenine, with the paracresyl radicle in the hordenine molecule.

Hydrocyanic Acid, Further Addition to List of Plants which contain. E. Couperot. (*J. Pharm. Chim.* [6], **28**, 542.) The following grasses give evidence of the presence of cyanogenetic glucosides, liberating HCN under the action of emulsin: *Briza minor*; *Catabrosa aquatica*; *Lamarckia aurea*; *Stipa tortites*; *Sorghum nigrum*; *Holcus lanatus*; *Poa pratensis*; *Festuca poa.* Also these Composites: *Aplotaxis candicans*; *Centaurea montana*; *C. solstitalis*; *Pyrethrum caucasicum*; *Dimorphotheca pluvialis*; *Cirsium arvense.*

Hydrocyanic Acid, Modification of Buignet's Method for the Determination of. G. Guerin and L. Gonet. (*J. Pharm. Chim.* [6], **29**, 234.) A standard solution of $CuSO_4, 5H_2O$ is prepared containing 30·81 Gm. in 1 litre. Each 0·1 c.c. of this = 1 Mgm. of HCN. Twenty-five c.c. of the dilute solution of HCN to be titrated, such as cherry laurel water, is treated with

75 c.c. of water, 10 c.c. of AmOH, and 20 drops of NaOH solution, sp. gr. 1·336. Then 0·5 Gm. of pure dry Na_2SO_3 is dissolved in the mixture, and the $CuSO_4$ solution is run in until a slight persistent blue shade is evident: the amount of $CuSO_4$ used up gives the equivalent of HCN present, according to the equation—

$$CuSO_4 + 3AmCN = Am_2SO_4 + Cu(CN)_2AmCN.$$

Ilicic Alcohol, Identity of, with α-Amyrin. E. Jungfleisch and H. Leroux. (*J. Pharm. Chim.* [6], **28,** 481.) The crystalline substance isolated by J. Personne from birdlime derived from holly, *Ilex aquifolium*, and named ilicic alcohol, $C_{25}H_{44}O$, is now found to be identical with α-amyrin.

Illicium religiosum, Essential Oil of. (*Schimmels' Report April*, **1909,** 57.) The oil, in addition to the constituents previously recorded (*Y.B.*, **1903,** 95), also probably contains linalol. This sample of oil had the sp. gr. 0·9848; $\alpha_D - 0°50'$; acid value, 1·8; ester value, 12·9.

Imperatoria ostruthium, Constituents of. J. Herzog. (*Archiv. Pharm.*, **246,** 414.) Oxypeucedanin, m.p. 140–141°C., has been isolated from masterwort rhizome. The concentrated benzol extract was treated with petroleum ether, which caused the separation of syrupy deposit; on decanting the liquid and treating the thick semi-fluid portion with Et_2O it assumed the appearance of a crystalline mass; this was pressed, treated with boiling ether, recrystallized from dilute alcohol, then from acetone, and gave 1 per cent. of pure white crystals of oxypeucedanin.

Indian Hemp, Valuation of. D. Hooper. (*Pharm. J.* [4], **27,** 80.) The determination of the iodine value of the alcoholic extract of the drug, with Huebl's solution, is shown to be a useful means of testing the freshness or otherwise of Indian hemp, and therefore its fitness for medicinal use.

Inositol, Occurrence of, in Drugs. G. Mellière. (*J. Pharm. Chim.* [6], **28,** 289.) Inositol is very widely distributed in animal and vegetable substances. Fresh vegetable tissues which contain it show, however, practically none when dried in the ordinary manner, unless desiccation has been conducted with great care, rapidly, and in the dark. Consequently galenical preparations from fresh plants contain much more than those from dried material. In the case of dried leaves, such as digitalis, the presence of inositol is a direct indication that due care has been exercised in the process of drying. A long list of drugs and dietetic vegetables which contain inositol is given.

Iodoform, Various Sources of. G. Guerin. (*J. Pharm. Chim.* [6], **29** 54.) Iodoform is produced by the action of iodine on many organic bodies in presence of alkali. It may even be obtained from CO_2. If 2 or 3 Gm. of an alkali carbonate be dissolved with 5 or 6 Gm. of KI in 50 c.c. of water, and this solution be mixed with 10 c.c. of AmOH and 10 c.c. of KOH solution, on adding slowly a solution of hypochlorite to the mixture black flocks of nitrogen iodide are first formed; when these disappear slowly on shaking; a large excess of AmOH is added, when the iodide is immediately converted into iodoform. The reaction may be represented as follows :—

$$KI + KClO = KIO + KCl.$$

$$NH_3{\cdot}I_3N + 2KIO + K_2CO_3 + 2NH_3 = CHI_3 + 2KI + 2KOH + N_2 + 3H_2O.$$

Ipomœa fistulosa, Constituents of. P. Haase. (*Inaug. Dissert. K. Wilhelms Universit. Strassburg.*) The plant is indigenous to Brazil and other parts of tropical South America, where it is known as "Algadão bravo" or "wild cotton." The dried root and stem contain 0·2 per cent. of jalapin (orizabin), wax, a tannin and a hexose. The seeds, in addition to these, contain a disaccharide, probably sucrose; plant mucilage and a fatty oil.

Isoptera borneensis Fat. C. J. Brooks. (*Analyst*, **34**, 206.) The fat prepared from the seeds of this tree by the Dyaks is known as Teglam fat and the seeds are called "Enkabang changi." The fat closely resembles enkabang fat. It has a sweet buttery odour and is greenish yellow in colour. It is used for dietetic purposes and is more esteemed in Borneo than any other fat. Sp. gr. 15·5/100°C. 0·856; m.p. 28 to 31°C.; saponification value, 192·1; iodine absorption, 31·5 per cent.; $\eta_{D 40°C.}$ 1,4561; acid value, 11·3.

Jalap, Resin Value of. (*Evans' Analyt. Notes*, **1908**, 21.) The resin content of the samples examined ranged from 7·4 to 11 per cent. In one-third of the samples examined it was below 8 per cent.

Jalap, Scammony, Orizaba and Tampico Resins, Optical Rotation of. W. B. Cowie. (*Pharm. J.* [4], **28,** 89.) The following figures have been obtained for the α_D of alcoholic solutions of these resins: Jalapin (ether-insoluble portion of jalap resin), $-39·30°$; Resina Jalapæ alb., $-37·30°$; Resina Jalapæ fusca, $-25·00$ (minimum); scammonin, $-26·00°$; Resina Scammoniæ alb,— 25·00°; Resina Scammoniæ fusca, -17 to 20; Orizaba resin (purified), $-27°$ (maximum); Orizaba resin (commercial), $-18·45°$.

The author does not agree with Guigues as to the unreliability of pure ether for the determination of the resin in scammony. (See *Y.B.*, **1900,** 152; **1902,** 204; **1907,** 145; **1908,** 448, 457, 462.)

Jasminium officinale, Stachyose in. J. Vintilesco. (*J. Pharm. Chim.* [6], **29,** 336.) Stachyose, $C_{24}H_{24}O_{21}$, identical in physical characters and behaviour towards ferments with that sugar from other sources, has been isolated from the fresh shoots of the white jasmine gathered in December.

Katio or Kachiau Oil. C. J. Brooks. (*Analyst,* **34,** 207.) The oil is obtained in Sarawak from the seeds of a species of Bassia of the N.O. *Sapotaceæ.* It is much prized by the Dyaks as a dietetic article. The oil is bright yellow, fluid, has a sweet taste and a pleasant odour of almonds. Sp. gr. 0·917 at 15·5°C.; solidifying point, 14°C.; saponification value, 189·5; $\eta_{D40°C.}$ 1,4616; iodine value, 63·2 per cent.; acid value, 2·2.

Lamium album, Presence of Stachyose (Manneotetrose) and a Glucoside hydrolized by Emulsin in. L. Piault. (*J. Pharm. Chim.* [6], **29,** 240.) The sugar stachyose or manneotetrose is present in the subterranean parts of *Lamium album* and is accompanied by a glucoside hydrolized by emulsin.

Lantana odorata, Essential Oil of. (*Schimmels' Report, November,* **1908,** 140.) The dry leaves yield 0·16 per cent. of lemon yellow oil, with hyssop-like odour, sp. gr. 0·9149; $\alpha_D - 1°36'$; ester value, 4·7; acetyl value, 51·0; solubility, 1 : 7 in EtOH 90 per cent.

Lantana odorata Leaves. (*Gehe's Report; Oesterr. Zeits. Pharm.*, **63,** 266.) The plant is indigenous to the West Indies and South America, when it is employed in baths for rheumatism; the infusion is also used as a remedy for catarrhs and as a gargle. The leaves contain 0·16 per cent. of a yellow aromatic essential oil boiling over 200°C. It appears to contain alcohols and esters. (See also *Y.B.*, **1886**, 206, 214; **1896**, 129.)

Lead Vapour and Dust, Determination of, in the Air of Work shops. F. Heim and H. Hébert. (*Bull. Sci. pharm.*, **16**, 272.) Trillat has shown that PbO_2 gives with tetramethyldiphenylamine in acetic acid a magnificent violet colour, stable on heating. The method will detect lead in a dilution of 1 : 3,000,000. Only Mn and Ca give a similar reaction, and the latter in a much less degree; these metals may easily be removed by washing the ash after the formation of sulphates. The amount of lead may be determined colorimetrically by matching the tint with solutions of PbO_2 of known strength. This method is applicable to the determination of lead in air. This air is aspirated through a tube packed in the middle with cotton wool, then through an absorption tube containing dilute H_2SO_4. The cotton is then ashed cautiously after adding a few drops of dilute H_2SO_4; the liquid in the absorption tubes is evaporated to dryness and also incinerated. On redissolving these residues Trillat's reagent is employed and the tint obtained matched with the standard solution. By this means the amount of lead in 5 or 10 litres of air may be determined with sufficient exactitude for hygienic purposes. The determination of the amount of lead in the atmosphere of workshops has hitherto been neglected, although the importance of the matter is obvious.

Lemon, Characters of the Essential Oil of. E. Berté and G. Romeo. (*Annal. Lab. chim. Cam. com. Messina; Schimmels' Report, April*, **1909**, 49.) Sp. gr., 0·856 to 0·861; $a_D + 58°$ to $+ 66°$ at 20°C., varying somewhat in different districts. The fruit known as "*bastardoni*" yields oil with the a_D sometimes below $+ 56°$; evaporation residue of hand pressed oil from 2 to 3·5 per cent.; in machine pressed oil up to 5 per cent. Citral from 4 to 7·5 per cent., according to method used. B.p. commencing at 175°C.

Lemon, Essential Oil of, Adulterated. E. J. Parry. (*Chem. and Drugg.*, **74**, 121.) Since the Sicilian earthquake, a large amount of adulterated lemon oil has been on the market. Samples adulterated with petroleum, castor oil, turpentine, and terpenes are reported on.

Lemon, Essential Oil of, Determination of Aldehydes in. A. H. Bennett. (*Analyst*, **34**, 14.) Twenty c.c. of lemon oil is mixed with 20 c.c. of N/2 hydroxylamine hydrochloride solution; about 8 c.c. of alcoholic N/KOH solution and 20 c.c. of strong alcohol are then added, which gives complete solution when hot. The mixture is gently boiled for 30 minutes under a reflux condenser and cooled. The condenser is washed down, the contents of the flask diluted with water to 250 c.c., and neutralized to phenolphthalein. The liquid is then titrated with N/2 H_2SO_4 with methyl orange indicator. The number of c.c. of acid used up, subtracted from the number used in a blank experiment with the same reagents but without lemon oil, gives the amount of hydroxylamine combined with the "citral," and × 0·076 gives the weight equivalent of that aldehyde. The acid titration with methyl orange indicator is best performed by spotting out. "Pure" citral, giving 4 per cent. of non-absorbed residue to bisulphite absorption, gave 95·1 to 96·4 per cent. of citral by this method. Barcelona lemon oil gave 4·7 per cent.; Calabria, 4·6; Syracuse, 4·3; and Messina, 5·2 per cent. respectively. From 4 to 5 per cent. will probably include almost all pure lemon oil.

Lemon, Essential Oil of, Sicilian, Limits of Variation of. (*Schimmels' Report, November*, **1908**, 60.) Thirty-six authentic samples from 12 different districts in Sicily, pressed in January, February, and March in each case, have been examined to determine how far locality and season may influence the characters of the oils. No definite conclusions can, however, be drawn from the results. The sp. gr. varied from 0·8569 to 0·8610 at 15°; a_D from + 56°50 to + 62°40; residue on evaporation from 2·2 to 3·6 per cent.; citral from 4·3 to 7·2 per cent.; a_D of first 10 per cent. were mostly 2 to 3° lower than those of the original oils; one Messina oil showing a difference of 5°29, which was exceptional. Syracuse oils generally showed the least difference and Messina the most. Pinene was present in all in minute quantity. The citral was determined by a new method which has not yet been completely tested, but which appears to give satisfactory results. St. Teresa Messina and Syracuse oils give the highest citral content and Mascali oils the lowest. The March pressed oil is generally the poorest in citral.

Lemongrass, Essential Oil of, from New Guinea and Uganda.

(*Schimmels' Report*, *April*, **1909**, 65.) Insoluble lemongrass oils have been examined from New Guinea and Uganda; the former ranged in aldehyde content from 65 to 78 per cent.; the latter contained 67 per cent.

Lemongrass Oil, Barbados. (*Schimmels' Report*, *November*, **1908**, 82.) Oil distilled from lemongrass grown in Barbados from Cochin-China seed is soluble 1 : 2 and more of 70 per cent. alcohol, thus differing from the insoluble West Indian oils; sp. gr. 0·900 at 15°C.; $\alpha_D - 1°$; aldehyde, 85·5 with Na_2SO_3 or 90·5 with $NaHSO_3$.

Lemongrass Oil, Distribution of, in the Plant. A. W. K. de Jong. (*Schimmels' Report*, *November*, **1908**, 81.) The leaves of *Andropogon citratus* contain the most oil, and the youngest more than those of older growth. As growth proceeds, the percentage of citral becomes slightly higher. The sheaths of the leaves contain less oil, but the thickened young roots yield a considerable amount. They should, therefore, be included in the distillation material. Javan lemongrass oil immediately after distillation is soluble 1 : 2 in alcohol 70 per cent.; but in a few days it becomes much less soluble, probably due to polymerization of a terpene.

Lemongrass Oils, Determination of Citral Content of. (*Schimmels' Report*, *November*, **1908**, 83.) Attention is again directed to the fact that in the determination of citral by the absorption method, the results obtained with Na_2SO_3 reagent are invariably from 2 to 5 per cent. lower than those resulting from the use of $NaHSO_3$ solution. The former combines solely with citral, whereas the latter forms soluble compounds with other aldehydic bodies as well. It is advisable, therefore, to state which reagent has been used in any given determination. From a practical point of view either process is equally useful, but it should be known upon which method a certified "citral" content is based.

Lemongrass, Varying Solubility of Essential Oil of. (*Schimmels' Report*, *April*, **1909**, 63.) De Jong (*supra*) has found that Javan lemongrass oil, although soluble1 : 2 in 70 per cent. alcohol when first distilled, becomes insoluble in a few days. Watts and Tempany have found the same to occur with West Indian oil; and oils distilled in other countries have shown the same property. Stapf has found that this is not due, as supposed, to polymerization of some constituents of the oil, but to the use of *Cymbopon citratus* for distilling instead of *C. flexuosus*, the true Malabar lemongrass or Cochin-grass. Where this is distilled, no ultimate insolubility occurs in the oil. This grass grows well in the Leeward Islands, where its experimental culture has been undertaken. (See also *Y.B.*, **1907,** 64, 94.)

Lignaloe, Cayenne, Essential Oil of. (*Schimmels' Report, April*, **1909,** 68.) The statement of Theulier (*Y.B.*, **1901,** 78) that Cayenne lignaloe contains no dextro-terpineol nor geraniol is not confirmed. A specimen examined has given about 5 per cent. of the former and 1 per cent. of the latter.

Lignaloe Oil, Methylheptenol in. (*Schimmels' Report, November*, **1908,** 85.) The alcohol methylheptenol has been isolated, for the first time as a natural product, from a fraction of lignaloe oil. It yielded methylheptenone on oxidation with CrO_3 and $HC_2H_3O_2$.

Lignaloe Oil, Presence of Olefine Hydrocarbon Oils and Terpenes in. (*Schimmels' Report, April,* **1909,** 66.) Octylene, C_8H_{16}, and nonylene, C_9H_{18}, have been isolated in small quantity from the first runnings in the fractionation of lignaloe oil. It is an open question whether these are normal constituents or not. The amount present, 1 to 2 per cent., is too small to render probable the admixture of petroleum oils for purposes of adulteration; it may be due to shipping the oil in dirty petroleum tins.

Besides these, an olefine terpene, $C_{10}H_{16}$, was isolated from the lower fractions; this is probably myrcene. It was accompanied by another olefine terpene, which could not be identified.

Lignaloe, Source of Dextro-rotatory Essential Oil of. (*Bertrand Roures' Report, October*, **1908,** 18.) An oil distilled from lignaloe seeds had the following characters: sp. gr. 0·8858 at 15°C.; $a_D + 1°30'$; $\eta_{D18°}$ 1,4655; soluble 1 : 1·5 of 70 per cent. alcohol; acid value, 3·4; saponfication value, 34·3. The constituents include dextro-linalol, lævo-terpineol, lævo-linalol, nerol, and geraniol. The seeds are probably the source of the dextrogyre oils occasionally met with in commerce. (See also *Y.B.*, **1906,** 47; **1908,** 105.)

Linamarin or Phaseolunatin. — Jorissen. (*J. Pharm. Chim.* [6], **28,** 462.) The author and Hairs having named linamarin the glucoside which obtained pure from *Linum* *usitatissimum* in 1891, and the identity of the so-called phaseolunatin of Dunstan and Henry with this glucoside having been established, a protest is raised against the retention of the name phaseolunatin, on the grounds of the priority of the term linamarin.

Liquor Ammon. Fort. Detection and Determination of Pyridine in. G. Pinchbeck. (*Pharm. J.* [4], **28,** 84 and 177.) *Detection.*—Dilute 50 c.c. of the sample a little with water and neutralize carefully with HCl; cool. Make alkaline with NaOH and shake out with 10 c.c. of $CHCl_3$. Draw off the $CHCl_3$ and filter. Divide the filtrate into two portions. Transfer one to a watch-glass and stir in 0·25 c.c. of strong HCl, and then add one or two drops of a 2 per cent. solution of Br in $CHCl_3$. A crystalline additive product, $C_5H_5NBr_2$, is precipitated if pyridine is present, even in small amount. Allow the other portion to evaporate in a current of warm air. Pyridine, if present, will be detected by the odour of the residue. The Br test is very delicate if care is exercised in carrying it out. The HCl should be added to the ammonia gradually, so as to prevent any considerable rise of temperature. Before making alkaline, the liquid must be perfectly cool, otherwise AmOH may be liberated and find its way into the $CHCl_3$ with the production of a fallacious result. The $CHCl_3$ solution must, for the same reason, be filtered through dry filter paper before applying the test.

Quantitative determination.—Dilute 100 c.c. of the sample with an equal bulk of distilled water, and neutralize carefully with dilute H_2SO_4. Cool and make alkaline with NaOH. Dilute to 400 c.c. with distilled water, and distil off one-third. Add 10 Gm. of $HgCl_2$ dissolved in 150 c.c. of distilled water, to the distillate. Filter. Percolate the precipitate on filter with cold neutral 92 per cent. alcohol until the double salt of of pyridine and $HgCl_2$ is removed This may be ascertained by testing a few drops of the filtrate for the bromine reaction already described. The hydro-alcoholic filtrate is then carefully neutralized, diluted to 400 c.c., and again slowly distilled. The distillate should not use up more than 2 c.c. of decinormal sodium hydroxide, using methyl orange as indicator. This is equivalent to 0·00948 per cent. of pyridine.

Litharge. J. S. Remington and R. F. Hartley. (*Pharm. J.* [4], **28,** 670.) A very complete series of analyses of twelve commercial samples of litharge is recorded.

Lithium Citrate. F. H. Alcock. (*Pharm. J.* [4], **27,** 586.) The revision of the official tests of lithium salts is suggested, especially with regard to the presence of K and Na. For this, the non-production of a precipitate with strong HCl is advocated.

Lycopodium, Fixed Oil of. A. Rathje. (*Archiv. Pharm.*, **246,** 699.) The lycopodium examined gave 49·2 per cent. of deep green oil, after rubbing down the spores with quartz and EtOH and extracting with $CHCl_3$. This had the sp. gr. 0·9361; η_D 1,4671; saponification value, 195·4; acid value, 18·6; iodine value, 80·85 to 81·17; Hehner value, 87·95 to 88·01; Reichert Meissl value, 7·3; acetyl value, 53·6 to 54. The fatty acids from 100 parts of the oil comprised: Lycopodium acid, 3; stearic acid, 0·5; palmitic acid, 0·5; myristic acid, 2·0; lycocopodoleic acid, 81 per cent.

Mafura Tallow and Mafura Oil. W. R. Daniel and J. McCrae. (*Analyst.*, **33,** 276.) *Mafura oil* is obtained by boiling the seeds of *Trichilia emetica*; it is a clear, yellow fluid much esteemed by the natives of Portuguese East Africa for dietetic purposes. It congeals when kept at 5°C. for some hours, but is fluid at the ordinary temperature. Sp. gr. 15°/15°C., 0·931; Zeiss butyro-refractometer index, 65·6° at 20°C.; acid, as oleic acid, 8·9 per cent.; saponification value, 202·5; iodine value, 66; acetyl value, about 235; true acetyl value, 36·5; Reichert-Wollny value, 2·0; a_D, 0. The insoluble fatty acids had the following characters: Sp. gr. 92°/15°C., 0·854; solidifying point, 44·2°C.; acid value, 201; saponification value, 206; iodine value, 68. *Mafura tallow*, obtained from the crushed seeds, is solid and poisonous; used by the natives for applying to the body. Sp. gr. 30°/15°C., 0·909; m.p. 29·5–38°C.; acidity, as oleic acid, 14·7 per cent.; saponification value, 201; iodine value, 43·5; apparent acetyl value, 218; true acetyl value, 16; Reichert-Wollny value, 1·3. The fatty acids had the sp. gr. 92°/15°C., 0·843; solidifying point, 52·1°C.; acid value, 204; saponification value, 205; iodine value, 46. The supposed toxic property of the tallow has not been verified. (See also *Y.B.*, **1903,** 112.)

Magnesia, Presence of Traces of Arsenic in. (*Evans' Analyt. Notes*, **1908,** 23.) Considerable arsenical contamination, amounting in some cases to from 10 to 30 parts per million of arsenic, have been noted. As regards other metallic impurities, these arsenical samples were exceptionally pure.

Magnolia kobus, Essential Oil of. Y. Asahina and H. Nakamura. (*Jap. P.J.*, **1908** [322]; *Schimmels' Report, April*, **1909,** 59.) The oil distilled in Japan from one-year-old twigs showed marked differences from Kobushi oil previously reported on (*Y.B.*, **1904,** 112; **1908,** 110). It was bright yellow and had an odour of citral; sp. gr. 0·892; a_D + 6°8′; acid value, 4·3; saponification value, 19·1; acetyl value, 56·48; soluble 1 : 1·4 of alcohol 85 per cent., opalescent with more. It contained 6 to 7 per cent. of citral, also eugenol, cineol and methyl chavicol, the latter in preponderating amount. No anethol was present, a constituent previously found in Kobushi oil.

Maltase of Maize. R. Huerre. (*Comptes rend.*, **148.,** 300.) The diastase of "early yellow" maize, grown in the Landes is a ferment working at a relatively high temperature. It is active between 22° and 80°C., and most energetic at 60°C. It has been named, therefore "' high maltase." "Early white" maize, from the same source, contains a different ferment resembling Lintner's yeast maltase. This is active between 15°–50°C., with a maximum activity at 40°C.

Manna-like Substances, Constituents of. A. Ebert. (*Zeits. allgem. Oesterr. Apoth. Verein.*, **46,** 427; *Apoth. Zeit.*, **1909,** 24, 44.) *Trehala*, the sweet substance found in the cocoons of a beetle, occurring on *Echinops persicus* and other species of *Echinops*, contains neither saccharose nor glucose; it gives 17·5 per cent. of trehalose, 27·08 per cent. of mucilage and 31·78 per cent. of starch and cellulose. Trehala starch does not give a blue reaction with iodine, but a brown colour. Although *Echinops persicus* belongs to the Compositæ, which usually contain no starch, starch granules could be detected in its tissues, reacting with iodine like those found in trehala. *Terendschabin*, the chief sweet purgative used by Persian doctors, derived from *Alhagi mannorum*, contains only saccharose and no glucose; it gave besides 5·2 per cent. of moisture, 9·35 per cent. of ash, and 20·35 per cent. of mucilage. The *manna of Salix fragilis* contains 17·45 per cent. of dextrose and 13·27 per cent. of saccharose; the *manna of Quercus vallonia* gave 53·20 per cent. of saccharose, 19·0 per cent. of glucose, but no invert sugar. The *manna of Cotoneaster nummularia* contains 37·5 per cent. of glucose, 12·9 per cent. of saccharose, and 24·2 per cent. of mucilage. These are all of Persian origin. *Euca-*

lyptus manna from *Eucalyptus gunnii*, var. *rubida*, contains melitose, 68·49 per cent.; glucose, 20·86 per cent.; invert sugar, 2·14 per cent.; mucilage, 3·22 per cent.; wax, 0·11 per cent.; ash, 6·78 per cent.; moisture, 9·74 per cent.; and residue, 4·27 per cent. *Eucalyptus pulverulenta* yields a manna containing 21·35 per cent. of melitose, 16·15 per cent. of fructose, and 60 per cent. of saccharose. *Tabaschir*, a siliceous secretion of the interior of bamboo stems, consists of about 90 per cent. of inorganic matter, with 4·25 per cent. of saccharose and 2·6 per cent. of mucilage. No single saccharine substance examined contained any mannitol, as found in true *Fraxinus* manna. The author has been unable to confirm the statement of Raby as to the existence of "chirkhesite" and "Bidenguebinose" in the manna of *Salix fragilis*, or of specific sugars in *Cotoneaster* manna. By oxidation with HNO_3 the mucilage of all the above mannas, except that of *Algahi mannorum*, affords mucic acid; the last-named gives instead oxalic acid.

Marsdenia condurango, Constituents of. K. Kuebler (*Archiv. Pharm.*, **246**, 620.) Condurango bark contains an amorphous glucoside, *condurangin*, $C_{40}H_{60}O_{16}$; an unsaturated alcohol, *conduritol*, $C_6H_{10}O_5$, and an essential oil; but no alkaloids. *Condurangin* was isolated by first extracting the powdered bark with ether, in which it is insoluble, and then treating the residual drug with acetone; after distilling off the acetone, the residual extract was re-dissolved in $CHCl_3$; the crude glucoside was then precipitated by the addition of a large volume of Et_2O. The yield was 2·98 per cent. By extracting the ether-exhausted bark with alcohol 96 per cent. instead of with acetone, 2·26 per cent. was obtained. With benzol as the glucosidal precipitant the yield was 2·92 per cent. The purified glucoside has no definite melting-point. It is quite amorphous however separated, dissolves in $CHCl_3$, acetone, water, and EtOH. It is insoluble in Et_2O and in C_6H_6. The aqueous solution has a pure bitter taste and froths strongly when shaken. It is optically inactive. Condurangin contains two OCH_3 groups, and is hydrolized by heating with dilute acids, thus:—

$$C_{40}H_{60}O_{16} + H_2O = C_6H_{12}O_6 + C_{34}H_{50}O_{11}.$$

Conduritol crystallizes in large prisms from hot alcohol; m.p. 142–143°C. Very soluble in water, less soluble in acetone and less so in alcohol; insoluble in other solvents. The aqueous solution is optically inactive and very sweet. It neither reduces

Fehling's solution nor ammoniacal $AgNO_3$. The essential oil, obtained by steam distilling the ether extract, has a powerful aromatic odour; sp. gr. 0·9741 at 18°C.; $a_D + 6{\cdot}7°$. By shaking with 3 per cent. NaOH this is separable into an acid and a neutral oil. The latter comprises about 30 per cent. of the whole; sp. gr. 0·9270; $a_D + 19{\cdot}56°$; b.p. 225. The acid portion solidifies on evaporating the solvent, and is apparently a mixture of fatty acids.

Matico Leaves of Commerce and their Essential Oils. H. Thoms. (*Seventh Internat. Congress of Applied Chemistry*, *Pharm. J.* [4], **28**, 867.) Matico leaves which now come into commerce do not usually consist of unmixed material from *Piper angustifolium*, which is the reason that the yield of volatile oil varies from 0·3 up to 4 per cent., and the physical and chemical properties of different specimens of the oil are different; the crystalline substance called matico-camphor, obtained from the oil thirty years ago, is not to be found in that now distilled. In January, 1908, the author received from a firm in Hamburg a bag of matico leaves from Central Peru (supplies having usually come from Southern Peru). This consisted of a mixture of about three parts of the leaves of *Piper lineatum* with one part of the leaves of an unknown species of *Piper*. On distillation 0·59 per cent. of oil was obtained, from which a well-crystallized body was separated, and the latter proved to be a mixture of camphor and borneol. A further supply of leaves from the same source was obtained, and carefully separated into the different kinds by picking it over leaf by leaf; in this consignment only a small proportion was from *P. lineatum*, the chief part consisting of the leaves of the unknown species, and as these proved to be the leaves yielding the camphor De Candolle named it *P. camphoriferum*; a third kind of leaves was present, and these were identified as *P. angustifolium*, var. *ossanum*. The three kinds so separated were then examined separately.

Piper camphoriferum yielded 1·11 per cent. of an oil of sp. gr. 0·950 at 20° C., and $a_D = + 19°21'$; about one-third of the oil distilled at 115° C. under a pressure of 25 mm., and from this a crystalline body separated which proved to consist of a mixture of two parts of camphor and one part of borneol. The other constituents of the oil included a terpene and the alcohol of a sesquiterpene.

Piper lineatum: These leaves yielded only 0·44 per cent. of oil of sp. gr. 0·958, and $a_D = + 8°45'$, containing no camphor; the greater part distilled between 140° and 160° under 15 mm. pressure, and consisted chiefly of sesquiterpene.

Piper angustifolium, var. *ossanum*: These leaves yielded 0·87 per cent. of oil, which on distillation *in vacuo* give a crystalline substance that appeared to consist of camphor and borneol, but the quantity was too small for investigation.

Two further batches of matico leaves, also obtained through Hamburg, were examined botanically. The first consisted of *P. acutifolium*, var. *subverbascifolium*, with a variety of the same characterized by a cordate base, and an unknown species. The second consisted of *P. acutifolium*, var. *subverbascifolium*, with small quantities of *P. mollicomum*, and *P. asperifolium*. The small amounts of the two latter were neglected, and the second batch distilled. 0·8 per cent. of oil was obtained having sp. gr. 1·10 at 20°C. and $a_D = + 0°22'$. This oil contained 1·5 per cent. of acids and phenols, and 22 per cent. of methoxyl; the principal constituents were pinene, dill-apiol, and a sesquiterpene. The leaves with cordate base were also distilled, and gave 0·8 per cent. of oil of sp. gr. 0·939 at 20°C. and $a_D = + 0°24'$; this contained 2 per cent. of acids and phenols and 4·2 per cent. of methoxyl. Pinene and dill-apiol were found to be constituents.

Medicinal Plants of German West Africa. Von Banke. (*Apoth. Zeit.*, **24,** 210.) *Dichapetalum toxicarium*: the leafy twigs contain traces of alkaloid, and a nontoxic saponin. *Canarium schweinfurthii* resin resembles true elemi and contains amyrin. *Canarium manfeldianum* resin contains no amyrin; it smells slightly like true elemi; freely soluble in $CHCl_3$ and C_6H_6; in alcohol 98 per cent. only 9 per cent. is dissolved. M.p. 134–135°C.; acid value, 9·8; saponification value, 60·8. *Bankinia reticulata*, known as "nyama" is used as a styptic dusting powder for wounds. It has a tannin-like odour, and contains traces of alkaloid. *Securidaca longipedunculata*, "dyoro," taken as snuff for headache, and used as a remedy for snake bite, contains tannin and a saponin; it has an odour of methyl salicylate and gives a senega-like decoction. *Borreria melliæ* leaves, used as a tea for diarrhœa, contain tannin and reducing sugar, but no alkaloid. *Trema guineensis*, var. *parvifolia*, is taken in soap and water as an anthelmintic. It contains no alkaloid, but a sugar and tannin. *Cassia absus* leaves are used for syphilis.

Waltheria americana affords a reddish brown powder, "bati," used for coughs, on account of its mucilaginous nature. *Crossandra guineensis*, a remedy for diarrhœa, contains no alkaloid, but much mucilage, sugar and tannin. A vulnerary powder from a Polygalaceous plant known as "Sandin dorma" contains an alkaloid. "Tarei," a bitter powder from a Rubiaceous plant, contains no definite bases, but an orange colouring matter with a green fluorescence and much bitter principle. *Cochlospermum tinctorium* wood, in powder form, is an ingredient in native ointment for burns. It contains much mucilage, a yellow colour, tannin, a sugar and alkaloid. *Croton lobatus* is a remedy for headache; contains tannin and a sugar. *Amaranthus viridis* yields a green alcoholic extract known as "Boboroa" having a narcotic hemp-like smell, but containing no alkaloid. Other native drugs, described only by their vernacular names, are described.

Melting Point of Fats and Waxes. P. B. Dallimore. (*Pharm. J.* [4], **27,** 802.) A device for the determination of the m.p. of fats, waxes, and similar solid bodies is described and figured.

Melting Point, A New Device for Observing. S. W. Bunker. (*Pharm. J.* [4], **28,** 324.) An apparatus, somewhat resembling the microscopist's "live box" is figured and described for observing the m.p. of such substances as cannot easily be powdered or be introduced into the capillary tube.

Melting Points, Variation of, by Different Methods. W. B. Cowie. (*Pharm. J.* [4], **28,** 89.) Results obtained by heating the substance in a capillary tube in a H_2SO_4 bath, on a glass plate suspended over a glycerin bath, and floated on a micro cover-glass on a mercury bath, are compared.

Mentha arvensis, var. glabrata, Essential Oil of. F. Rabak. (*Mid. Drugg. and Pharm. Review*, **43,** 5.) The fresh herb, growing in S. Dakota, afforded 0·8 per cent. of peppermint-like oil; sp. gr. 0·9267; a_D + 16°27′; acid value, 2·6; ester value, 13·1; acetyl value, 47; it contained no aldehydes. Solubility in alcohol 90 per cent., 2 : 1.

Mentha viridis, Hungarian, Essential Oil of. (*Schimmels' Report*, *April*, **1909,** 85.) Hungarian spearmint oil is richer in carvone than German or American oil; it contains 72 per cent. instead of 50 per cent., and gives a permanently clear solution with alcohol 80 per cent., 1 : 1, and more. Sp. gr. 0·936, 0·944 at 15°C.; α_D $-38°38'$ to $-46°25'$; η_{D20}. 1,490 to 1,491. No dextro-carvone from caraway oil was present.

Mercury Antipyrine Compound. J. Eury. (*Bull. Sci. pharmacol.*, **15**, 384.) Mercuric oxide, 1 mol., combines with antipyrine 2 mols., forming the compound $Hg2(C_{11}H_{11}N_2O),H_2O$, in fine prismatic needles; m.p. 180°C.; soluble in water 0·42 : 100 at 15°C.; in 10 per cent. NaCl solution 1·26 : 100 at 15°C. It is obtained by precipitating 27·10 Gm. of $HgCl_2$ with sufficient KOH solution, and boiling the washed HgO thus obtained with 37·6 Gm. of antipyrine, filtering while hot. The mercuric antipyrinate separates out on cooling.

Mercuric Iodide and Camphor, Condensation Products of. J. E. Marsh and R. de J. F. Struthers. (*Proc. Chem. Soc.*, **24**, 267.) The following series of mercury-camphor compounds have been obtained: (A) $(C_{10}H_{15}OHg)_2O$ and its salts; (B) $C_{10}H_{14}OHg_2I_2$; (C) $(C_{10}H_{14}O)_2Hg_3O$; (D) $(C_{10}H_{14}O)_3Hg_4I_2$; (E) $(C_{10}H_{14}O)_4Hg_5I_2$; (F) $(C_{10}H_{14}O)_5Hg_6I_2$. B, D, E and F are formed directly by the action of HgI_2 on camphor in presence of an alkali. B is formed by the action of potassium ethoxide on camphor and HgI_2 in the cold. D is formed in hot aqueous solution of KOH containing an excess of KI; E, when there is only just enough KI to keep the HgI_2 in solution; F, when the KI is deficient. B is formed from D or E, by prolonged action of alcoholic KOH until all the I is removed. Glacial acetic acid converts D into $C_{10}H_{14}OHg_2I_2$, and mercuric acetate-camphor which is soluble. From this the base A is obtained by means of NaOH. Several salts of A have been prepared.

Menthyl Cinnamate, and other Esters, Varying Optical Activity of. T. P. Hilditch. (*Proc. Chem. Soc.*, **24**, 286.) Menthyl cinnamate in alcoholic solution has the $\alpha_D - 60·44°$; the compound alone, without a solvent, has the $\alpha_D - 85·95°$. Similar irregularities have been previously observed with menthyl acetate, and other esters; all these show greater optical activity alone than their respective solutions; they are therefore not in the same molecular condition when dissolved as when undissolved.

[This fact should be borne in mind when recording the α_D of dissolved essential oils rich in certain optically active esters. —Ed. *Y.B.*]

Methyl Alcohol, Detection of, in Ethyl Alcohol. L. E. Henkel. (*Analyst*, **33**, 417.) One c.c. of the mixed alcohols is placed in a small flat bottom distilling flask and treated with an oxidizing agent. If $Am_2S_2O_8$ is used 0·8 Gm. of the salt is added with 3 c.c. of dilute (1 : 5) H_2SO_4 ; if $K_2Cr_2O_7$ is used, 1·5 Gm. is taken, with 1·5 Gm. of pure H_2SO_4 ; in either case the mixture is diluted to 20 c.c. ; the flask is connected with a small condenser and quickly heated over a naked Bunsen, the distillate being collected in five separate test-tubes, in portions of 2 c.c. The first 2 c.c., which will contain all the acetaldehyde, may be rejected. To each of the remaining fractions a few drops of 1 : 200 morphine hydrochloride solution, and a little strong H_2SO_4 are added, so as to form a layer on the bottom of the tube. In presence of formaldehyde, derived from the oxidation of MeOH, a violet ring will be formed at the zone of junction. Five per cent. of MeOH in the EtOH may be thus detected.

Milk, Normal, Constancy of P_2O_5 Content of. W. M. Doherty. (*Analyst*, **33**, 273.) The amount of P_2O_5 in the ash of milk is found to be very constant, so that its determination is an important factor in establishing the freedom from added water. It is claimed that although the amount present is relatively small, it can be determined with much greater accuracy than the "solids not fat" at present taken as the factor for calculating the amount of added water. In twenty-nine samples examined, the figure for P_2O_5 in 100 c.c. of milk ranged from 0·2231 Gm. to 0·2130 Gm. ; eleven of these samples gave 0·2201 Gm., and the mean figure for the twenty-nine samples 0·2200 Gm. P_2O_5 for 100 c.c. One abnormal sample, apart from these, from a cow which had recently calved, gave only 0·1942 Gm. P_2O_5. Details of the analytical methods are given for the determination of this factor.

Milk Sugar, Tests for Cane Sugar in. A. Beythien and A. Friedrich. (*Union Pharm.*, **50**, 157.) *Dekker's modification of Selivanoff's reaction :* One Gm. dissolved in 8 c.c. of water is treated with 0·05 Gm. of resorcin and 2 c.c. of HCl ; the mixture is heated on the water-bath. One per cent. of sucrose is evident by the red colour formed. *E. Schmidt's reaction :* The powdered sugar is sprinkled on H_2SO_4 ; lactose is scarcely coloured ; sucrose becomes black. *Beaudonin's reagent* (2 c.c. of sesame oil, 2 c.c. of hydrochloric acid), added to 0·5 Gm. of the powder gives a distinct colour reaction with 1 per cent. of cane sugar. *Cotton's test:* Ten c.c. of 5 or 6 : 100 solution of the sugar is treated with 10 c.c. of dilute HCl (1 : 10) and 0·5 Gm. of ammonium molybdate. On warming to 60–70°C. a blue colour or precipitate is obtained in presence of sucrose. Lactose gives no reaction. *Lorin's test:* The powder is intimately mixed with anhydrous oxalic acid and plunged, in a test tube, for 5 minutes into a boiling water-bath. In presence of cane sugar a yellow colour, passing to black, is obtained.

Morphine and Derivatives, Sensitive Colour Reactions of. G. Denigès. (*Internat. Congress Applied Chem., Pharm. J.* [4], **28,** 868.) A reagent is prepared with 1 volume of a 1 : 1,000 aqueous solution of glyoxal and 20 volumes of H_2SO_4 (sp. gr. 1·84); these proportions must be adhered to. If to 2 c.c. of this reagent in a test tube there is added a small quantity (5 to 6 Mgm.) of one of the alkaloids named below, the following colours will be obtained—

Morphine and apomorphine, red; codeine and its homologues (e.g. ethylmorphine), violet; oxymorphine, blue, quickly changing to green.

After one or two minutes, 2 c.c. of pure acetic acid may be added, the whole shaken and then allowed to stand for two minutes, when the colours will be—Morphine, bluish or bluish green; apomorphine, red; codeine, violet; apomorphine, yellow-brown.

Morphine, Sensitive Quantitative Colour Reaction for. Mai and Rath. (*Archiv. Pharm.*, **244,** 300.) One c.c. of a 1 : 1000 soluton of morphine hydrochloride is evaporated to dryness on the water-bath, and the residue treated with 1 c.c. of a mixture of 2 drops of formalin in 3 c.c. of H_2SO_4. A deep violet colour is produced, which may be transferred to a small colour tube, diluted with 4 c.c. of H_2SO_4 and the colour matched with that given under similar conditions by a known weight of morphine. As little as 0·03 Mgm. of morphine hydrochloride gives a distinct, quantitatively measurable, violet shade.

Mustard Oil, Indian, Expressed, Adulterated with Sesame Oil. C. T. Bennett. (*Chem. and Drug.*, **73,** 940.) A specimen of so-called East Indian mustard oil has been found to contain about 75 per cent. of sesame oil. The sample had the following characters. Colour paler than normal; sp. gr., 0·917 ; acid value, 13·0 ; saponification value, 182·6 ; iodine value, 101·5 ; m.p. of fatty acids, 26°C. It gave a marked violet colour reaction with Tocher's test (*Y.B.*, **1891,** 226) and from the high acid value the sesame oil employed was evidently of low quality.

Myristicin, Synthesis of Substances allied to Cotarnine from. A. H. Salway. (*Proc. Chem. Soc.*, **26,** 175.) Myristicin from essential oil of nutmeg has yielded oxyisocotarnine, but attempts to isolate cotarnine have hitherto failed. The successive stages of the synthesis are illustrated by formulæ.

Myrtle, Essential Oil of. (*Schimmels' Report, April,* **1909,** 71.) Besides the ordinary Spanish and French oils of commerce, the following oils from other sources have been examined.

Oil from	Sp. gr. at 15°C.	α_D	$\eta_D 20°$	Acid Value.	Ester Value.	Acetyl Value.	Solubility.
Corsica	0·8828	+26°46′	1,46644	1·0	13·0	30·2	1 : 2·5 alcohol 90 per cent.
		to					
	0·8868	+23°15′	1,46911	1·6	17·1	38·5	10 : 8 ,, ,,
Syria	0·8930	+14°30′	—	1·9	20·3	72·0	1 : 5 alcohol 80 %
	0·8985	+11°	1,46417	—	26·6	70·7	1 : 1 ,, ,,
Asia Minor	0·9138	+10°42′	1,46704	1·5	39·4	94·9	10 : 9 alcohol 80 per cent.
Spain	0·913	+22°	1,467		68	103	1 : 2, rarely up to 1 : 5, alcohol 80 per cent.
	to	to	to	to	to	to	
	0·924	+25°20′	1,470	1·7	83	117	
France	0·890	+15°	1,465		19	38	2 : 1 90 per cent. alcohol.
	to	to	to	to	to	to	
	0·904	+23°	1,468	1·5	28	56	1 : 5 or 1 : 10 in 80 per cent. alcohol.

(See also *Y.B.*, **1907,** 109.)

New Remedies, Characters and Tests for Certain. — Knoll. (*Apoth. Zeit.*, **24,** 358.) *Bromural, a*-Monobromisovalerianylurea. Small white, slightly bitter needles ; sparingly soluble, 0·37 in 100, in water ; more soluble in EtOH and Et_2O. Readily sublimed ; m.p. 147–149°C. Leaves no appreciable ash on incineration. If 0·1 Gm. be heated with 2 c.c. of strong HNO_3, the solution gives at once a yellow precipitate with $AgNO_3$ reagent. When heated with NaOH solution it evolves NH_3 ; the cooled solution, shaken out with Et_2O, and that solvent separated and evaporated, affords an oily residue with the characteristic odour of valerianic acid. If 1 Gm. of bromural mixed with 4 Gm. of Volhard's oxidation mixture (Na_2CO_3, 1 ; KNO_3, 2) be heated in a Pt crucible until all organic matter is burnt off, and the residue be dissolved in water, filtered, acidified with HNO_3 and treated with 2 c.c. of 10 per cent. $AgNO_3$ solution, the precipitate of AgBr formed should not weigh more than 0·84 Gm. If 2 Gm. of bromural be dissolved in 5 c.c. of alcohol 96 per cent., and heated on the water-bath for 4 hours with 2 Gm. of sodium ethylate under a reflux condenser, a white precipitate of NaBr is obtained. On removing this by filtration and evaporating the filtrate to dryness, a crystalline residue of dimethyl-acrylyl-urea is obtained, which, when recrystallized from water, should melt at 215°C.

Bromural tablets should weigh 0·5 Gm. and contain 0·3 Gm. of bromural. One such tablet, crushed and extracted with three successive 20 c.c. of hot alcohol, should give a residue weighing 0·3 Gm. when the solvent is evaporated. (See also *Y.B.*, **1907,** 189.)

Digipuratum. A yellow, odourless, bitter powder, the active principles of which are insoluble in cold water and in dilute acids, but are readily soluble in dilute alkalies. If 0·1 Gm. of digipuratum be added to about 5 c.c of $HC_2H_3O_2$, containing 1 per cent. of 1 : 20 $FeSO_4$ solution, a lower fiery red ring is formed, and above this a light green zone, changing to dark blue.

Euresol. Resorcin mono-acetate. A thick reddish yellow fragrant oil ; almost insoluble in water and petroleum ether ; soluble in organic solvents ; distils at about 170°C. under 15 mm. pressure. If 2 c.c. of euresol be heated on the water-bath for 15 minutes, the loss in weight should not exceed 0·2 Gm. If 2 drops of euresol be melted with 0·5 Gm. of phthalic anhydride and boiled for 3 minutes, then allowed to solidify, a particle of the mass when treated with 5 c.c. of 10 per cent. NaOH solution should give a fluorescent liquid. A few drops of euresol in alcoholic solution give off an acetous odour when heated with an equal quantity of strong H_2SO_4. Euresol should be protected from light. (See *Y.B.*, **1899,** 226.)

Iodival, a-Mono-iodo-iso-valerianyl-urea. Small white, slightly bitter needles ; m.p. about 180°C. Responds generally to the tests enumerated above for bromural, substituting reactions of iodine for those of bromine. Iodival should be stored away from the light.

Styptol. Neutral cotarnine phthalate. A yellowish micro-crystalline powder readily soluble in water; the solution is faintly alkaline to litmus. M.p. 105–110°C. with slight decomposition. It should contain 75 per cent. of cotarnine, and lose about 5 per cent. in weight at 100°C. On precipitating the alkaloid with NaOH from aqueous solution it forms a fine crystalline powder, which when dried melts at 132°C. If 0·1 Gm. of styptol be melted with 0·5 Gm. of resorcin and when cold treated with 5 c.c. of 1 : 10 solution of NaOH, a strong fluorescence will be evident. If 0·2 Gm. of styptol, dissolved in 2 c.c. of water, is treated with 5 drops of 1 : 20 NaOH solution, and allowed to stand for two hours, the precipitate when collected on a tared filter, washed with 5 c.c. of water and dried at 70°C., should weigh 0·135 to 0·14 Gm. Styptol should be kept in the dark.

Tannalbin. A brownish, odourless and tasteless powder, almost insoluble in cold water and in EtOH. When shaken with water and filtered, the filtrate gives a deep blue colour with Fe_2Cl_6. After boiling with water and filtering, the filtrate gives a precipitate with egg albumin. Tannalbin forms a gelatinous mixture with NaOH solution; on heating this to boiling and adding excess of HCl, the odour of H_2S is evident. If 2 Gm. of tannalbin be mixed with 93 c.c. of water at 40°C., 7 c.c. of N/10 HCl and 0·25 Gm. of pepsin, and maintained, without stirring for 3 hours at 40°C., the undissolved residue collected on a tared filter, washed three times with 10 c.c. of water, and dried at 100°C., should not weigh less than 1 Gm.

Nickel, Precipitation and Determination of, in Presence of Cobalt by Means of Ammonium Molybdate. M. E. Pozzi-Escot. (*Bull. Soc. Chim.* [4], 3, 775, 776, 777.) H. Grossmann and B. Schuck (*ibid.* 894). Pozzi-Escot states that Ni is precipitated from neutral or faintly acid solutions by means of ammonium molybdate: the precipitate is soluble in water, but insoluble in saturated solutions of ammonium salts. Co, under these conditions, gives no precipitate. The solution containing Ni is saturated with AmCl, then treated with ammonium molybdate reagent. The double molybdate of nickel and ammonium is completely precipitated.

Grossmann and Schuck maintain that the method is not absolutely reliable for the quantitative determination of Ni in presence of Co.

Nicotine, Determination of, as Silicotungstate. G. Bertrand. (*Bull. Sci. pharm.*, **16**, 7.) Ten Gm. of the finely divided tobacco is extracted with four successive 100 c.c. of 1 : 200 HCl solution by heating each for 20 minutes in the boiling water-bath, centrifugating and decanting each time. The nicotine in the bulked acid liquid is then precipitated with silico-tungstic acid, or its potassium salt 1 : 10 or 1 : 20. The precipitate is collected by centrifugation, suspended in acid water containing a little of the reagent and again centrifugated. The precipitate is then distilled with steam in presence of excess of MgO, when the nicotine is liberated, and is titrated in the distillate with standard H_2SO_4 solution (3·024 Gm. H_2SO_4 in 1,000 c.c. ; 1 c.c. = 10 Mgm. of nicotine). If desired, a gravimetric determination may be made by incinerating the precipitate and weighing the residue ; this weight × 0·1139 gives the equivalent of nicotine. A rapid method of extraction gives equally good results. Twelve Gm. of tobacco is boiled with a known volume (300 c.c.) of 1 : 200 HCl for 30 minutes under a reflux condenser. After cooling, centrifugating, and filtering, an aliquot part (250 c.c. = 10 Gm. of tobacco) is precipitated as silicotungstate as above. This compound has the formula $12WoO_3SiO_22H_2O{\cdot}2C_{10}H_{14}N_2 + 5H_2O$ at 30°C., and becomes anhydrous when dried at 120°C.

Nutmeg, Expressed Oil of. F. B. Power and A. H. Salway. (*Proc. Chem. Soc.*, **24**, 197.) Ceylon nutmegs yielded 26·6 per cent. of concrete oil on expression, and 42·9 per cent. when extracted with ether. The expressed oil has the m.p. 48°C. ; sp. gr. 50°/50°C., 0·9399 ; acid value, 11·2 ; saponification value, 174·6 ; iodine value, 57·8. It contains the following constituents in the percentages given : Essential oil, 12·5 ; trimyristicin, 73 ; oleic acid, as glyceride, 3 ; linolenic acid, as glyceride, 0·5 ; traces of formic, acetic, and cerotic acids ; unsaponifiable matter, 8·5 ; resinous matter, 2. The chief unsaponifiable constituent is a new compound, $C_{18}H_{22}O_5$, amounting to about 5 per cent. of the expressed oil. It is a yellow transparent very viscid liquid, b.p. 270–280°C. under 15 mm. It has no physiological action.

Ochoco Fat. J. Lewkowitsch. (*Analyst*, **33**, 313 This fat is derived from the seeds of *Scyphocephalum ochocoa* N.O. *Myristicaceæ* indigenous to the West Coast of Africa. The fat as usually extracted is accompanied by a dark brown colouring matter. The only method of obtaining a perfectly white fat is to cut out and extract the white endosperm. It consists of 98 per cent. of myristicin and 2 per cent. of olein. It should, therefore, prove a valuable source of myristicin and of myristic acid. The physical characters of the fat are given.

Ocimum minimum, French, Essential Oil of. (*Schimmels' Report, April*, **1909,** 20.) The oil distilled in France from dwarf or little basil, *Ocimum minimum*, agrees in physical constants with commercial German and French oil from the great basil, *O. basilicum*, but differs markedly in chemical constituents. Two specimens examined contained 14 per cent. of eugenol, and probably linalol. The sp. grs. were 0·9102 and 0·8901 at 15°C.; $a_D - 11°58'$ and $13°36'$; acid value of one specimen, 5·3; ester value, 12·5. (See also *Y.B.*, **1905,** 119; **1908,** 144.)

Oleuropein, a New Glucoside from Olives and Olive Leaves. E. Bourquelot and J. Vintilesco. (*J. Pharm. Chim.* [6], **28,** 303.) The biological method having indicated the presence of glucosidal matter in fresh olives and olive leaves, these were treated by the boiling alcohol and acetic ether method (*Y.B.* **1906,** 70) by which the amorphous glucoside oleuropin was isolated. It is a slightly yellowish amorphous hygroscopic powder; $a_D - 127°$; soluble in water, and in hot EtOH; sparingly soluble in cold EtOH; insoluble in Et_2O. Its aqueous solutions are coloured yellow by alkalies, blood red by H_2SO_4, and green by Fe_2Cl_6. They reduce Fehling's solution before hydrolysis and more strongly after. The glucoside is incompletely precipitated from aqueous solution by basic lead acetate. Like other glucosides hydrolized by emulsin, it yields glucose on hydrolysis. It is accompanied by mannitol, which is separated by crystallization from the alcoholic extract, before treatment with acetic ether. (See also *Y.B.*, **1908,** 148.)

Olibanum, Essential Oil of. (*Haensel's Report, October*, **1908,** 12.) Essential oil of frankincense contains over 5 per cent. of a new alcohol, olibanol, b.p. 333–334 under 751 mm. Sp. gr. 0·9596 at 20°C.; $a_D - 71·5°$.

Olive Oil, Sulphur-contaminated. (*Evans' Analyt. Notes*, **1908,** 25.) Samples of olive oil have been met with which developed an unpleasant odour on heating and from which H_2S could be obtained. They are probably sulphur-bleached oils, and are unsuited for pharmaceutical use. Their analytical characters were otherwise normal.

Parsley, French, New Phenol in Essential Oil of. H. Thoms.

(*Berichte*, **41**, 2753.) Essential oil of French parsley seeds was found to contain an ester richer in OCH_3 than apiol, and by freezing in liquid CO_2 the fractions containing this body, $C_6H(OCH_3)_4(C_3H_5)$ was isolated and is considered to be the tetramethyl ester of the phenol-allyl apionol $C_3H_5{\cdot}C_6H{\cdot}(OH)_4$. This ester occurs in considerable quantity in the oil, with myristicin and a very little crystalline apiol.

Patchouli Leaves, Essential Oil of Fresh and Fermented. A. W. K. de Jong. (*Schimmels' Report*, *November*, **1908,** 95.) Singapore patchouli oil shows no marked difference in characters whether distilled from fresh, dried, or fermented leaves. Java patchouli oil differs very markedly according to the condition of the leaves before distillation. One specimen distilled from fresh leaves had a terpene-like odour ; sp. gr. 0·9344 ; ester value, 9·9. Another sample from fresh leaves had a slight odour of patchouli ; sp. gr. 0·945 ; ester value, 5·8. Both these oils had the $a_D - 15°20'$, and both were very soluble in alcohol 85 per cent. The dried unfermented leaves gave an oil with an odour of calamus ; sp. gr. 0·9165 ; $a_D + 3°15'$; when the leaves are slightly fermented the odour of the oil remains like that of calamus and the a_D falls to $+ 2°32'$; strong fermentation gives an oil with a faint patchouli odour ; sp. gr. 0·921 ; $a_D - 0°26'$. The solubility of these oils from dried and fermented leaves is very much less, being 1 : 8 to 1 : 10 in alcohol 85 per cent. These changes in physical characters indicate marked alteration of chemical constituents.

Pennyroyal, Essential Oil of, Adulterated. (*Schimmels' Report*, *November*, **1908,** 67.) Two specimens of oil of pennyroyal adulterated with eucalyptus oil have been met with. These contained but 20 to 30 per cent. of pulegone, whereas the pure oil gives 80 per cent. Both yielded 45 per cent. of distillate below 210°C., and these fractions contained much cineol ; the pure oil only gives about 5 per cent. below that temperature when thus distilled, and contains no cineol.

Pentadesma kerstingii Seeds, Constituents of. Von Bandke. (*Apoth. Zeit.*, **24**, 178.) The seeds, from Togoland, yield 35·8 per cent. of yellow, tasteless, faintly aromatic butter-like fat, m.p. 32–35°C. ; solidifying point, 24–20°C. ; saponification value, 152 ; iodine value, 52.

Peppermint, French, Essential Oil of. (*Roure Bertrand's*

Report, October, **1908,** 23 ; *Schimmels' Report, April*, **1909,** 77.) Roure Bertrand gives the following characters for rectified French peppermint oil : Sp. gr. 0·9159 at 15°C. ; a_D — 16°50′ ; menthyl acetate, 13·3 per cent. ; total menthol, 54·9 per cent. The oil does not congeal even when cooled to — 17° and sown with menthol. Schimmels point out that English and Saxon peppermint oils also sometimes fail to solidify when cooled, and regard the amount of crystallizable menthol as of no direct importance. They have also observed that when distillation is performed from fresh green herb, the oil undergoes marked oxidation, with corresponding rise in sp. gr. This change may be avoided by employing only the partly dried or withered herb for the purpose. The easily oxidized substances are then converted into non-volatile resins, and thus do not contaminate the distillate. The same applies to lovage root, and some other distillation materials. (See also *Y.B.*, **1905,** 125.)

Petroleum, American and European, Test to Distinguish. C. Arragon. (*Apoth. Zeit.*, **24,** 43.) Pure HNO_3, sp. gr. 1·4, is freed from HNO_2 by boiling with a little urea. Equal volumes of the petroleum and this acid are shaken up for 30 seconds in a stoppered cylinder. American petroleum gives a violet colour in the upper layer of liquid on separation and the acid is coloured yellow. European petroleums become yellow, while the acid gives a brown shade. Mixtures of the two kinds give, at first, a violet tint which suddenly changes, after continued shaking for 10 to 25 seconds, to yellow.

Phenol, Determination of, in Tablets and Galenical Preparations. W. A. Puckner and A. H. Clark. (*Proc. Amer. Pharm. Assoc.*, **56,** 824.) The substance containing the phenol is covered with water in a distilling flask, and a current of CO_2 is run through for 15 minutes ; the contents of the flask are then boiled and distilled ; a current of steam, as well as a brisk current of CO_2, is run through the liquid continuously until about 250 c.c. of distillate has been collected. An aliquot part of this (50 c.c.) is transferred to a 250 c.c. flask, treated with 25 c.c. N/10 Br solution and acidified with 5 c.c. of HCl. After frequent shaking for 30 minutes, 5 c.c. of KI reagent is added, then a little $CHCl_3$, and the liberated I titrated with N/10 thiosulphate in the usual manner. CO_2 is preferable to other acids for liberating phenol, especially in presence of $BiONO_3$. It is also the best means of liberating it from solutions of caustic alkalies. The presence of sulphites, bromates and nitrates does not affect the results.

Phenolphthalein, Determination of, in Pharmaceutical Preparations. K. Kollo. (*Pharm. Prax.: Apoth. Zeit.*, **24**, 283.) (1) Tablets or pastilles are finely powdered, dried and percolated with acetone until the solvent which passes no longer reddens with alkali. The acetone is evaporated and the residue weighed.

(2) The powdered material is similarly extracted with 8 per cent. NaOH solution, the aqueous liquid evaporated and the phenolphthalein precipitated by means of $HC_2H_3O_2$. It is then collected, washed, dried at 100°C., and weighed.

(3) The material, which should not contain less than 0·4 to 0·6 Gm. of phenolphthalein, is dissolved in 10 to 15 per cent. NaOH solution, and treated, in small quantities at a time, with the following reagent: KI, 3 Gm.; I, 2 Gm.; water, 20 c.c. The colour changes from red to blue, and when sufficient I has been added, to yellow. HCl is then added, when tetra-iodophenolphthalein separates out. This is collected, washed cautiously with EtOH, then with Et_2O, both previously saturated with tetra-iodophenolphthalein, dried at 100°C., and weighed. Or the precipitate may be collected by centrifugation. 1 Gm. of tetra-iodophenolphthalein, $C_6H_4(CO)_2 \cdot (C_6H_2I_2OH)_2 = 0{\cdot}3869$ Gm. of phenolphthalein.

(4) The phenolphthalein is extracted by process (1), then acetylized. The acetyl product is then quantitatively saponified with alcoholic N/NaOH solution in the usual manner: 0·4 Gm. of acetyl-phenolphthalein = 0·318 Gm. phenolphthalein.

Phycoerythrin, the Pigment of Red Algæ. E. K. Hanson. (*Proc. Chem. Soc.*, **26**, 117.) Phycoerythrin absorbs bluish-green light, and gives an orange fluorescence. This fluorescent light gives two bands coincident with the two absorption bands of chlorophyll. This confirms the hypothesis that phycoerythrin assists assimilation in deep water plants by absorbing the light available at these depths and degrading it to yellow and red light which can be utilized by the chlorophyll. The precise chemical nature of phycoerythrin has not been determined, for it has not been obtained pure. It is a colloid, soluble in water, precipitated by the ordinary protein precipitants and yielding leucine after acid hydrolysis. It does not give the biuret reaction and contains less N than a true protein. It is attacked by trypsin, but not by pepsin.

Phloroglucinol in Kola Nuts. E. Bernegau. (*Berichte Pharm.*, **18**, 468 ; *J. Pharm. Chim.* [4], **29**, 295.) Phloroglucinol, $C_6H_6O_3$, has been isolated from sterilized kola nut paste from the Cameroons. It is probably derived from a phloroglucide glucoside.

Phosphoric Acid, Detection and Colorimetric Determination of. I. Pouget and D. Chouchak. (*Annales Chim. analyt.*, **14**, 125.) A reagent is prepared with 10 c.c. of 15 : 100 solution of ammonium molybdate ; 2·5 c.c. of pure HNO_3 ; and 1 c.c. of cold-saturated solution of strychnine sulphate. This darkens on keeping, consequently for quantitative work it should be freshly prepared, and if necessary, filtered quite bright. The solution of the substance in HNO_3, which should not contain more than 0·01 to 0·05 Mgm. of P_2O_5, prepared as for the ordinary molybdate determination, is evaporated to dryness on the water-bath. The residue is taken up with 10 c.c. HNO_3 35 : 100 ; after 20 minutes' contact, the acid solution is filtered into a graduated cylinder and washed up to 47 c.c. ; 2 c.c. of the above reagent is added, the whole thoroughly shaken up, and the volume adjusted to 50 c.c. Meanwhile the standard is prepared by adding to 3 c.c. of P_2O_5 solution containing 10 Mgm. P_2O_5 in 1 litre, 10 c.c. of HNO_3, 35 : 100, and water to 47 c.c. ; after mixing 2 c.c. of the phosphomolybdic reagent is added, and the volume made up to 50 c.c. After standing for 20 minutes the two solutions are compared in the colorimeter. If t and x are the amounts of P_2O_5 in the standard and sample respectively, and e_t and e_x the respective depths of liquid required to produce the same tint ; then $\frac{e_t}{e_x} = \frac{x}{t}$ giving the value of x. The reaction is very sensitive ; the opalescence given by 1 of P_2O_5 in 20,000,000 of water is quite distinct. The usual substances which accompany P_2O_5 do not affect the result unless they are present in large quantity. In the case of Ca, the result is not affected when the amount is 20,000 times greater than that of the P_2O_5. Iron must not exceed the amount of P_2O_5 by more than 1,200 times its weight.

Phosphorus, Microchemical Detection of. G. Denigès. (*Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28**, 868.)

The phosphorus is first converted into H_3PO_4. The solution is then treated as described under the microchemical detection of arsenic, (p. 11 *ante*). The results are :—

With ammoniacal $AgNO_3$ reagent, yellow crystals of the rhombic system in many varieties, hemihedra, hexahedra, hexagonal plates, rhombohedra, dodecahedra, tetrahedra, etc.

With $Hg2NO_3$ reagent. Chiefly at the edges, colourless prisms in rosettes or in groups parallel to their long axes.

With magnesium mixture. Characteristic, arborescent crystals, and truncated quadrangular pyramids.

Pimenta acris, var. citrifolia, Essential Oil of. F. Watts and H. A. Tempany. (*West Ind. Bullet.*, **1908**, 273 ; *Schimmels' Report, April*, **1909**, 21.) The oil distilled by the authors in Tortola was yielded in the proportion of 1·11 per cent. It has a lemon-like odour and a pale yellow colour ; sp. gr. 0·8937 at $\frac{27°}{16·6°}$ C. ; a_D — 0·16° ; citral content, 44 per cent. ; phenol content, 10 per cent. ; completely soluble in alcohol 60 per cent.

Pimpinella saxifraga Root, Constituents of. J. Herzog and V. Hânca. (*Archiv. Pharm.*, **246**, 402.) Pimpinellin, $C_{13}H_{10}O_5$, m.p. 119°C., is the chief constituent of common burnet saxifrage root. It was first isolated impure by Buchheim in 1872, and later by Heut, who described it as difficult to obtain pure, and the melting point of his substance (106°C.) confirms his statement. The author finds it comparatively easy to isolate in a state of purity. The concentrated benzol extract is treated with twice its volume of petroleum ether. The precipitate soon assumes a well formed crystalline structure, and is readily recrystallized pure from alcohol, when the m.p. is 119°C. It is accompanied by other coloured substances partly soluble in petroleum ether, which have not definite m.p.'s and were not further investigated. Pimpinellin contains two OCH_3 groups, and from its action with NaOH appears to have lactonic functions. Its formula may be written $C_{10}H_4O·CO·O·(OCH_3)_2$. An oxidation product is obtained by the action of H_2O_2 in presence of alkali. When liberated, this crystallizes from water in long slender needles, and in thicker needles from acetic acid ; m.p. commencing at 212°C., complete with decomposition at 220°C. It sublimes, is readily soluble in alcohol, sparingly in water, the solutions are markedly acid. It has the formula $C_9H_6O_3$.

Pinus resinosa, New Acid in Resin of. G. B. Frankforter. (*J. Amer. Chem. Soc.*, **31**, 561.) After removing the oil of turpentine by evaporation at a gentle heat *in vacuo*, the resin of the Norway pine was found to contain abietic acid, and a new resin acid, resinic acid, $C_{25}H_{38}O_5$, m.p. when pure 97–98°C., occurring in a crystalline powder and forming unstable NH_4 and Ba salts; it is probably allied to Tschirch's palabienic acid. The m.p., 129–130°C., of the abietic acid present is lower than that recently given.

Piper methysticum Root, Constituents of. E. Winzheimer. (*Archiv. Pharm.*, **246**, 338.) An exhaustive review of the chemistry of the constituents of kava-kava root is thus summarized: The drug contains, besides indifferent constituents, the following percentages:—Resins, 5·3; methysticin, 0·39; ψ-methysticin, 0·268; yangonin, 0·184; alkaloid, 0·022; glucosides, 0·69, as well as sugar; and 0·8 per cent. of an amorphous acid insoluble in water. The mixed resins consist of 23 per cent. of resin acids and 77 per cent. of resenes; the latter contain some crystalline resin esters. Methysticin, $C_{15}H_{14}O_5$, m.p. 137°C., is the methyl ester of methystinic acid; ψ-methysticin, m.p. 113–114°C., is an ester, possibly the ethyl-ester, of methystinic acid. Yangonin, $C_{15}H_{14}O_4$, is a lactone. These three bodies are obtained from the crystals of the alcohol extract by fractional crystallization from acetone. (See also *Y.B.*, **1889**, 72, 131; **1904**, 181.)

Piper mandoni, Essential Oil of. (*Schimmels' Report, April*, **1909**, 70.) The leaves of this plant have recently appeared in commerce as a substitute for matico. They yield about 0·8 per cent. of brownish aromatic oil: sp. gr. 0·9360 at 15°C.; $a_D + 1°5'$; $\eta_{D20°}$ 1,49704; acid value, 1·8; ester value, 5·1; acetyl value, 46·7; soluble 1 : 6 in 70 per cent. alcohol.

Pipette Wash Bottle. P. B. Dallimore. (*Pharm. J.* [4], **28**, 527.) This apparatus is described and figured.

Plant Constituents, Notes on. J. Dekker. (*Pharm. Weekblad.*, **46**, 16, 29.) *Cleistanthus collina* bark contains a saponin, tannin and a crystalline phytosterin (*Y.B.*, **1900**, 130). *Roucheria griffithiana* contains lupeol and a saponin. Various species of *Gnetum* were examined and only negligible traces of alkaloids found in all; the leaves contained a bitter principle, and the fruits a saponin. A saponin-body is also present in *nutmeg*, which may account for the toxic action sometimes following the use of the spice in quantity. (See also p. 116.)

Polyscias nodosa, Saponin of. Van der Haar. (*Pharm. Zeit.*, **53**, 900.) The saponin of this Araliaceous plant has the formula $C_{25}H_{42}O_{10}$. When hydrolized with mineral acids it is split up into sapogenin, lævo-arabinose and dextrose. This is the first recorded instance of the occurrence of arabinose among the hydrolysis products of a saponin, and points to the analogy of constitution between saponins and gums.

Potassium Iodide and HgI_2, Double Salts of. J. E. Marsh and R. de J. F. Struthers. (*Proc. Chem. Soc.*, **24**, 266.) When an aqueous solution of K_2HgI_4 is shaken out with Et_2O or some other organic solvents, $KHgI_3$ is removed as a heavy oil. With camphor the double salt $KHgI_3$, $4C_{10}H_{16}O$ is formed. KI and dimercuriodocamphor, $C_{10}H_{14}OHg_2I_2$, also form a double salt readily soluble in alcohol or acetone, although the two constituents separately are only sparingly soluble.

Prunus serotina, Lævomandelonitrile Glucoside in. F. B. Power and C. W. Moore. (*Proc. Chem. Soc.*, **26**, 27.) The air-dried bark yielded 0·075 per cent. of HCN on maceration with water. It contained lævomandelonitrile glucoside $C_{14}H_{17}O_6N$, m.p. 145–147°C. $[a]_D - 29{\cdot}6°$; an enzyme hydrolizing β-glucosides. The alcoholic extract yields benzoic acid and essential oil, but no HCN. Besides these constituents the following were isolated : a phytosterol, $C_{27}H_{46}O$, m.p. 135–136°C., $[a]_D - 34{\cdot}0°$; palmitic, stearic, oleic, linolic and isolinolenic acids ; and after acid hydrolysis, dextrose ; and β-methylæsculetin. The water soluble portion of the alcoholic extract also gave tannin, sugar, trimethylgallic and paracoumaric acids, and traces of a substance melting at 240–246°C.

Pseudo-cinchona, African, New Alkaloid from. E. Fourneau. (*Comptes rend.*, **148**, 1170.) A new crystalline alkaloid has been isolated from a species of *Pseudo-cinchona* from the French Ivory coast. The bark was extracted with dilute H_2SO_4, and the base precipitated with Na_2CO_3. The precipitate was dissolved in boiling acetic ether and reprecipitated with Et_2O, in which it is insoluble, but which removes a second amorphous alkaloid. The ether insoluble base was recrystallized from boiling anhydrous EtOH, from which it separates in fine colourless anhydrous crystals. From 60 per cent. EtOH it separates in long fine hydrated scales. The latter form is soluble in cold absolute EtOH, but immediately separates in the anhydrous form. The base has the formula, $C_{21}H_{26}N_2O_3$; it is consequently isomeric with quebrachine, but it is lævogyre $[a]_D - 125°$, whereas quebrachine is dextro-rotatory. It does not melt sharp, it first fuses at 200°C. with loss of water; then resolidifies, and finally remelts at 241–242°C. It is alkaline in reaction to litmus and is practically insoluble in water. It gives crystalline salts. The hydrochloride is almost insoluble in water in presence of free acid.

Polyporus igniarius, Constituents of. J. Zellner. (*Apoth. Zeit.*, **24**, 111.) The petroleum ether of the dried fungus consists of a mixture of ergosterin and a fat, acid value 87·80. The ether extract contains a resin, but neither fumaric nor malic acids, found by other workers, were detected. The alcohol extract contains mannitol and glucose, with a phlobaphene. The aqueous extract gives carbohydrates with traces of albuminoids. The fresh fungus contains a lipase, a diastase, a ferment hydrolizing glucosides, but no invertin. When distilled with dilute alkali, it yields a mannitol and traces of volatile amine bases.

HCN in Gas Meter Water. D. B. Dott. (*Pharm. J.* [4], **28**, 428.) One hundred c.c. of gas meter water was found to contain 0·064 Gm. of HCN.

Pyrus toringo, Glucosides of. Y. Hirose. (*Pharm. J. Jap.*, **1909**, 1; *Apoth. Zeit.*, **24**, 194.) The alcoholic extract of the bark of *Pyrus toringo* gives a white crystalline glucoside, toringin, $C_{21}H_{20}O_9 + 2H_2O$; m.p. 135–137°C., when anhydrous 240°C. When hydrolized, it yields chrysin and glucose, thus

$$C_{21}H_{20}O_9 + H_2O = C_{15}H_{10}O_4 + C_6H_{12}O_6$$

The mother liquor after separating toringin, affords quercitrin. The bark is the source of a native yellow colour known as "Dzumi," obtained by boiling with K_2CO_3 and precipitating the alkaline extract with alum. The powdered bark is also used as an adulterant of powdered drugs such as licorice and gentian.

Quinine, Determination of, in Cinchona Bark. W. Duncan, (*Pharm. J.* [4], **28**, 429.) The method consists of salting out the quinine sulphate from the sulphates of the "total alkaloids" by means of Na_2SO_4. Ten Gm. of a red bark treated by the B.P. process gave 0·647 Gm. of total alkaloid. This was dissolved in a minimum of H_2SO_4, diluted with water to 100 c.c., transferred to a water-bath at boiling point, and neutrality to litmus established by the addition of N/10 NaOH. To this neutral solution 10 Gm. Na_2SO_4 was added, dissolved, and the whole set aside for 24 hours. The collected crystals, washed and dried as before, weighed 0·226 Gm., equivalent to 1·963 per cent. of anhydrous quinine in the original bark.

A yellow bark, which by the U.S.P. process yielded 7·086 per cent. of total alkaloid, yielded by the foregoing 5·119 per cent. of quinine.

The quinine in the crystalline sulphate may be conveniently determined by titration, the crystals being washed with Na_2SO_4 solution to remove the sulphates of other alkaloids. The filter containing the quinine sulphate with the adhering sodium sulphate may be immersed in sufficient alcohol to dissolve the alkaloidal salt, a few drops of phenolphthalein added, and the whole titrated with N/20 alcoholic NaOH, each cubic centimetre of which is equivalent to 0·021878 Gm. of B.P. quinine sulphate or 0·016092. Gm. anhydrous quinine.

Quinine, Determination of, in Cinchona Bark. N. H. Cohen. (*Pharm. J.* [4], 28, 670.) Commenting on the above process of Duncan, the author finds that, in common with most separation processes, the result is not sufficiently accurate for the quantitative determination of quinine, since the crystals salted out by sodium sulphate are not even approximately pure quinine sulphate. The method can only serve to give a rough approximation of the amount of quinine present.

Quinine, Determination of, in Quinine Tannate and Ferrocitrate. E. Rupp and W. Calliess. (*Apoth. Zeit.*, **24,** 159.) Instead of shaking out the liberated alkaloid with ether from a separator in the usual way, 1·2 Gm. of the *tannate* is shaken up in a closed flask with 10 Gm. of K_2CO_3 solution, sp. gr. 1·334, then exactly 30 Gm. of ether is added, the whole is again shaken for some minutes, 0·5 Gm. of powdered tragacanth is added, and the shaking repeated ; after 5 minutes for subsidence, exactly 25·3 Gm. of the clear ether solution is weighed off into a tared capsule, then evaporated, dried and weighed. The weight should be at least 0·3 Gm. With *ferrocitrate* the process is similar with the same original weight, but soda solution is used to liberate the alkaloid. The weight of ether weighed on is 31 Gm.; and that of the ether solution evaporated 25·1 Gm.

Quinine Salts, Tests for Purity of. D. L. and B. T. Howard and O. Chick. (*Internat. Congress Applied Chem.*, *Pharm. J.* [4], **28**, 868.) The official empirical tests of the B.P., U.S.P., Ph.G., and French Codex are found to give widely different results in the hands of different analysts, although the individual results are themselves concordant. The personal equation largely affects the results of these tests. The requirement of a high degree of chemical purity for quinine salts so greatly enhances the price, without any corresponding increase in therapeutical value, that its enforcement serves no useful purpose.

Quinine Tannates, True and False. P. Biginelli. (*Gazz. chim., ital.*, **37**, 205; *Bull. Soc. Chim.* [4], **6**, 20.) The formula of the Swiss and German pharmacopœias, which direct quinine salts to be employed to prepare " tannates," do not produce true tannates, but merely additive compounds. Commercial tannates are thus obtained, and contain proportions of quinine varying from 18 to 30 per cent. True tannates can only be obtained by using alkaloidal quinine and tannin. Even then, the products are amorphous, and vary in composition with the amount of base and tannin used.

Resin Acids from Various Species of Pinus. W. Schkateloff. (*Mon. Sci.* [4], **21**, 122.) The various resin acids which have been previously described by others are considered all to be modifications of one and the same acids, which the author names *silvinic acid*. This occurs in three forms, *a-silvinic* acid, a white crystalline powder, m.p. 143–144°C., $a_D - 73{\cdot}67°$: *β-silvinic acid*, in well-formed crystals, m.p. 160°C., $a_D - 92{\cdot}5°$: *γ-silvinic acid*, in long prismatic needles, m.p. 179–180°C., and $a_D 0$. No dextro-rotatory modification has been found. These silvinic acids have been found in the resins of *Pinus larico pollisiana*, *P. strobus*, *P. abies*, *Larix sibirica*, *P. cembra*, *P. maritima*, and *Abies sibirica*, collected by the author, and in various commercial *Pinus* resins. If during the process of preparing the resins, oxidation is avoided the silvinic acid obtained is almost pure. The oleoresin is melted with steam, strained, and when of a buttery consistence, strongly pressed. From the solid residue the silvinic acids may be obtained by crystallization from alcohol or by mixing it with turpentine and again pressing. The resin obtained by melting the latter product is almost colourless.

Resins, Determination of Acid Value of. J. Marcusson and G. Winterfeld. (*Chem. Rev. Fett. Harz.*, **1909** [5]; *Apoth. Zeit.*, **24,** 334.) The following method is suggested to obviate the interference of the complex constituents of certain resins, which markedly modify the figures for acid value, according to the conditions under which the determinations are made. From 3 to 4 Gm. of the finely powdered material is dissolved by warming, under a reflux condenser, with 200 c.c. of equal volumes of C_6H_6 and neutral absolute EtOH. When cold, the insoluble matter is filtered out, and the filtrate titrated to a red colour with N/10 alkali and phenolphthalein. The following acid values were thus obtained: Manila copal, 141·8; mined amber, 26·7; pressed natural amber, 14·5; mastic, 60·2; sandarac, 137·7 dammar, 24·8; soft elemi, 15·2.

Rhamnus catharticus Fruits, Constituents of. N. Waljaschko and N. Krassowski. (*J. russ. phys. chem. Ges.*, 1502; *Pharm. Zeit.*, 159.) Contrary to Tschirch and Polacco (*Y.B.*, **1901,** 106), the authors do not find that buckthorn berries contain any specific colouring substances, but the same yellow bodies, quercetin and rhamnin, which are found in the fruits of *Rhamnus tinctoria* and *R. infectoria*. Besides these they contain about 2 per cent. of emodin bodies, from which the following new compounds were isolated: Emodin-anthranol, $C_{15}H_{12}O_4$; its glucoside, gesterin, $C_{26}H_{30}O_{13} + \frac{1}{2}H_2O$; rhamno-cathartin, $C_{17}H_{30}O_{13} + H_2O$ a glucoside of emodin. By hydrolizing with ferments the following decomposition ferments were obtained:—Emodin, identical with frangula-emodin and rhamnoside, the emodin of rhamnoxanthin, $C_{21}H_{20}O_9 + H_2O$, which, although having the same empirical formula, is not identical with frangulin; also rhamnonigrin and a resinoid, emodin-containing substance. Other constituents were: Fatty oil, succinic acid, glucose, galactose, rhamnose and a pentose (arabinose?). Of these sugars only glucose occurs free; the others are combined in the glucosides.

Rose, Essential Oil of, Adulterated with Alcohol. E. J. Parry. (*Chem. and Drugg.*, **73,** 244.) The author is unable to agree with the constants given by Schimmels for pure rose otto (*Y.B.*, **1908**, 170). Five samples from the best sources, believed to represent pure oils of the 1908 distillation, had the following characters—

Sp. gr. at 30° C. . .	0·8555	0·8549	0·854	0·8557	0·856
Optical rotation . . .	—2°40′	—2°30′	—3°	2°35′	—2°30′
Refractive index at 25°C.	1·4635	1·4629	1·4622	1·4630	1·4626
Melting-point . . .	22°	22°	23°	22·5°	23°

A large number of grossly adulterated samples are reported on, all of which contain alcohol, without, however, showing any marked deviation from the usually accepted "constants." After washing with water the sp. gr. and refractive index were so much raised as to indicate that geraniol with a little added alcohol is being largely used as an adulterant. The aqueous washings of all these oils gave iodoform.

Rose, Essential Oil of, Adulterated with Alcohol. (*Schimmels' Report, November*, **1908**, 107.) The above statement of Parry that alcohol is a frequently used adulterant of otto of rose is confirmed. As much as 10 per cent. may be so added under certain conditions without greatly disturbing the "normal constants" of the oil. Such oils show an increase of sp. gr. after washing out the alcohol with water. (See also *Y.B.*, **1905** 149 ; **1906**, 68 ; **1908**, 170.)

Rosin, Reaction for, in Soap. J. Sans. (*Annales Chim. analyt.*, **24**, 140.) A trace of rosin, heated gently with 2 c.c. of neutral methyl sulphate, gives at first a pink colour, passing from deep violet to light brown on continued heating. Fatty acids and their soaps do not give the reaction. The test, therefore, serves to detect the presence of rosin in soap. Neutral ethyl sulphate gives a similar reaction.

Saffron, Valuation and Detection of Adulteration of. F, Spaeth. (*Pharm. Zentralh.*, **49**, 679.) An exhaustive treatise, detailing all the chief published methods for the colorimetric valuation of saffron, the detection of adulterants, artificial colours, and substitutes, also the chemical constituents of the genuine drug. The majority of these details have been previously published in *Y.B.*

Sage, Essential Oils of, Dalmatian and Spanish. T. F. Harvey. (*Chem. and Drugg.*, **73,** 393.) The analysis of five samples of sage oil is given in the following table:—

Sp. gr.	α_D	Solubility in 80 per cent. Alcohol.	Acid Value	Ester Value	Total Borneol per cent.	η_D at 20° C.	%V/v distilling below 170° C.	%V/v distilling 170–200°C.	%V/v distilling 200–220° C.	
0·9210	+12·45°	1 volume and more	1·6	6·7	9·9	1·4626	3	65	21	Dalmatian
0·9229	+13·62°	Ditto	2·2	6·9	9·5	1·4619	3	63	22	
0·9225	+ 9·93°	Ditto	2·2	7·0	10·5	1·4618	3	61	22	
0·9253	+10·23°	Ditto	1·3	8·5	14·8	1·4645	2	55	31	
0·9053	+ 9·60°	2 volumes	0·6	17·2	15·2	1·4619	13	64	10	Spanish

Salicylic Acid and Derivatives, Detection of Phenol and Cresotic Acid in. H. Engelhardt and H. W. Jones. (*Proc. Amer. Pharm. Assoc.*, **56,** 866.) A slight modification of Carletti's test (*Y.B.*, **1908,** 175) not only serves to detect phenol in salicylic acid, but also ortho-, meta-, and para-cresotic acids. With ortho-cresotic acid a brown colour zone is obtained, with meta- and para-cresotic acids a violet red colour similar to that given with phenol results. Among the various samples of salicylates examined, out of four specimens of natural oil of wintergreen three gave positive results for phenol by this test. Possibly phenolic bodies are a natural constituent of the oil.

Salicylic Acid, Determination of, in Presence of Cinnamic and Benzoic Acid. J. Bougault. (*J. Pharm. Chim.* [6], **28,** 145.) The mixed acid (about 0·4 Gm.) is treated with 1 Gm. of dry Na_2CO_3 and dissolved in 50 c.c. of water on the water-bath; excess of I in solution of KI is then added to the solution on the boiling water-bath. A violet precipitate is quickly formed; heating is maintained under a reflux condenser, and the process completed by boiling for 10 minutes. The whole of the salicylic acid is thus converted into Lautemanns' "red body," tetraiododiphenylenequinone, or tetraiododiphenylenedioxide $(C_6H_2I_2O)_2$. When the reaction is complete excess of I is removed with a few drops of Na_2SO_3 solution, and the precipitate collected, washed, dried at 100°C., and weighed. The weight × 0·4012 gives the equivalent of salicylic acid present. Phenol, and para-oxybenzoic acid, affording the same iodo compound, may be determined in a similar manner. The analogy existing between the method of obtaining the "red body" and of preparing aristol from thymol, indicates that these compounds may be chemically related, and renders doubtful the presumed ester function of aristol; it is more probably an iodo-lactone.

Samoan Vegetable Products, Essential Oils from. (*Schimmels' Report, November*, **1908**, 136–140.) *Mumuta grass tubers*; *Andropogon* sp. Yield 1·05 per cent. of brown essential oil resembling vetiver in odour; sp. gr. 0·9845 at 15°C.; $\alpha_D + 41°50'$; $\eta_{D20°}$ 1,51505; acid value, 0·9; ester value, 13·3; acetyl value, 65·2; insoluble 1 : 10 in EtOH 80 per cent., soluble in EtOH 90 per cent.

Nuanua leaves; *Nelitris* sp. Yield to steam distillation 0·63 per cent. of yellowish oil with an odour of ambergris; sp. gr. 0·9025; $\alpha_D + 9°30'$; acid value, 2·2; ester value, 7·4; soluble 1 : 8 in EtOH 80 per cent., with slight separation of paraffin. With water distillation the same material gave a less fragrant oil; sp. gr. 0·9373; $\alpha_D - 10°10'$; acid value, 11·0; ester value, 11·0.

Maali resin. Botanical source undetermined. A soft elemi-like resin; distilled with steam yields 16·08 per cent. of bright green oil solidifying at ordinary temperatures; odour aromatic, like tea-rose; $\alpha_D + 7°15'$: saponification value, 3·3; acetyl value, 46·6; soluble 1 : 1 in EtOH 90 per cent.; m.p. between 65–80°C. By crystallization from EtOH 70 per cent., a new crystalline sesquiterpene alcohol, maali-alcohol, of the generic formula $C_{15}H_{26}O$, was isolated, in long silky needles, m.p. 105°C., $[\alpha]_D + 18{\cdot}33°$; b.p. about 260°C. On dehydrating this maali-sesquiterpene, $C_{15}H_{24}$, sp. gr. 0·9190, $\alpha_D + 121°21'$, η_D1,52252, was obtained. Maali alcohol forms a definite CrO_3 compound when heated with $K_2Cr_2O_7$ and H_2SO_4 or with CrO_3 alone in aqueous solution This crystallizes slowly from alcohol and petroleum ether in long purple needles, $(C_{15}H_{26}O)_2CrO_3$, m.p. 111°C. The liquid portion of the oil after removing maali alcohol, appears to be a solution of the solid alcohol in a lævo-rotatory sesquiterpene.

Sandalwood, Australian, Essential Oil of. (*Evans' Analyt. Notes*, **1908**, 33.) A specimen of Australian sandalwood oil had the sp. gr. 0·970, $\alpha_D + 5°30'$; not brightly soluble in 80 per cent. alcohol. This oil is a possible adulterant of the E.I. variety.

Sandalwood, East African, Essential Oil of. (*Schimmels'*

Report, **1908,** 109.) The wood of so-called East African "sandalwood" identified as derived from a species of *Osyris*, probably *O. tenuifolia*, N.O. *Santalaceæ*, yielded 4·86 per cent. of a brown oil with an odour resembling vetiver and gurjun balsam. Sp. gr. 0·9477 ; a_D — 42°50′ ; η_D1,52191 ; ester value, 11·1 ; acetyl value, 72·8 ; soluble 1 : 7 or 8 of alcohol 90 per cent.

Sandalwood, East Indian, Essential Oil of. (*Evans' Analyt. Notes*, **1908,** 32.) Sandalwood oil distilled in Liverpool during 1908 had the following characters : Sp. gr., 0·975 to 0·979 ; a_D — 15° to — 19° ; santalol not below 92·3 per cent. ; esters as santalyl acetate 3 to 4·1 per cent. (See also *Y.B.*, **1902,** 99 ; **1904,** 161 ; **1906,** 71 ; **1907,** 143 ; **1908,** 175–181.)

Sandalwood Oil, East Indian, Constituents of. K. Bode. (*Apoth. Zeit.*, **24,** 17.) A summary of the results of previous investigations is given. The chief constituents of the oil are: *a*-and *β*-santalol, $C_{15}H_{24}O$; *a*- and *β*-santalene, $C_{13}H_{24}$; santalal, $C_{15}H_{24}O$; two acids, teresantalic acid, $C_{10}H_{14}O_2$, and santalic acid, $C_{15}H_{24}O_2$; the hydrocarbon santene, C_9H_{14} ; and two ketones, one of which has the formula, $C_{11}H_{16}O$. Besides these, acid compounds and phenols are also present.

a-Santalol gives the aldehyde $C_{15}H_{22}O$ when oxidized ; and this furnishes the acid $C_{15}H_{22}O_2$. With $KMnO_4$ santalol gives dioxyhydrosantalol, $C_{15}H_{26}O_3$, and tricyclosantalic acid, $C_{11}H_{16}O_2$, m.p. 71–72°C. The latter acid is also formed on oxidizing santalol with ozone, the corresponding tricyclo-eksantalal, $C_{11}H_{16}O$, being simultaneously formed. By reduction with Mg tricyclo-eksantalol is formed from the acid $C_{10}H_{16}O_2$, and *a*-santalene also furnishes tricyclo-eksantalal, $C_{11}H_{16}O$, when oxidized with ozone ; but *β*-santalene gives a bicyclo-aldehyde, $C_{11}H_{16}O$, bicyclo-eksantalal ; the latter is also formed by the oxidation of *β*-santalol.

When teresantalic acid is reduced, teresantalol, $C_{10}H_{16}O$, m.p. 113°C., is obtained ; it gives the monochlor compound, $C_{10}H_{15}Cl$, from which the hydrocarbon teresantalene $C_{10}H_{16}$ has been prepared, m.p. 165–168°C. Teresantalic acid also gives dihydroteresantalic acid, $C_{10}H_{12}O_2$. When heated with $HCHO_2$ teresantalic acid gives a lactone, $C_{10}H_{14}O_2$, m.p. 190°, and the formic ester of an alcohol, $C_9H_{16}O$, named π norborneol, giving derivatives similar to those of borneol. The structure of the santene molecule appears to be allied to that of camphor.

Sandalwood, East Indian, Optical Rotation of Essential Oil

of. A. R. L. Dohme and H. Engelhardt. (*Proc. Amer. Pharm. Assoc.*, **56,** 811.) The statements as to unreliability of the optical test are reiterated (*Y.B.*, **1908,** 179; and *ibid*, 175, 177, 180, 181) and the value of the santalol determination reaffirmed.

Santalyl Chloride, Bromide and Iodide. (*Pharm. Zeit.*, **54,** 17.) The santalol halogen compounds have some importance in medicine and perfumery. The chloride is readily obtained by the interaction of santalol or sandalwood oil with carbon oxychloride in presence of organic bases, or by the action of the phosphorus chlorides or thionyl chloride. The bromide or iodide may be obtained in a similar manner. Thus sandalwood oil, 220, and dimethylaniline, 120, in solution in C_6H_6, is cooled and treated with carbon oxychloride 99, in the same solvent, added gradually, the mixture being kept cold. After 24 hours contact the dimethylaniline is removed by shaking out with acid water; the C_6H_6 solution is dried over $CaCl_2$, the solvent is distilled off, and the santalyl chloride separated from the residual oily liquid by fractional distillation *in vacuo.* The process is subject to a German patent.

Saponin, Detection of, in Beverages. J. Ruehle. (*Zeit. Untersuch Nahr. Genussm.*, **16,** 165; *Analyst*, **33,** 408.) One hundred c.c. of the liquid is neutralized with $MgCO_3$; $AmSO_4$, 20 Gm. is added and the mixture is shaken out in a separator with 9 c.c. of pure phenol. After removing the aqueous layer, the phenol is shaken out with 50 c.c. of water and 100 c.c. of Et_2O, 4 c.c. of EtOH being added if necessary to break down the froth. When separation has occurred, in 12 to 14 hours, and the layer of emulsion does not exceed 1 or 2 mm. in depth, the aqueous portion is drawn off and evaporated. The residue, after drying in the desiccator, is left in contact with about 10 c.c. of acetone for 20 hours; the liquid is decanted, and the residue again treated with acetone as before. After this second washing, the residue is dried at 100°C., and weighed. It is then tested for saponin. With liquids containing dextrin, 100 c.c. is evaporated to about 20 c.c. EtOH 96 per cent., 150 c.c., is then added. After 30 minutes the mixture is heated until the EtOH just boils, and filtered immediately. The filtrate is evaporated until all the EtOH has been driven off, the aqueous residue is then diluted to 100 c.c. and treated as above.

From 70 to 90 per cent. of the saponin present can be thus recovered.

Satureja macrostema, Essential Oil of. (*Schimmels' Report, April*, **1909,** 97.) The oil distilled in Mexico from the indigenous Labiate was yellow, with a mint-like odour; sp. gr. 0·9182 at 15°C.; $\alpha_D + 6°51'$; $\eta_{D20°}$1,46852; acid value, 15·6; ester value, 10·3; acetyl value, 37·9. Pulegone is probably present.

Scammony and Mexican Jalap Resins, Distinctive Character of. F. O. Taylor. (*Amer. J. Pharm.*, **81,** 105.) The resin of *Ipomœa orizabensis* has a lower saponification value, 186·6 to 187·1, than true scammony resin, which ranges from 238·0 to 240·5. (See *Y.B.*, **1904,** 223; **1906,** 108; **1907,** 145; **1908,** 457, 462.)

Senecio latifolius, Alkaloids of. H. E. Watt. (*Proc. Chem. Soc.*, **26,** 68.) This South African Composite contains 1·2 per cent. of total alkaloids before flowering, and only 0·49 per cent. afterwards. Two bases are present: *senecifoline*, $C_{18}H_{27}O_8N$, crystallizing in colourless rhombic plates, m.p. 194–195°C.; $[\alpha]_D + 28°8'$; and *senecifolidine* in similar shaped crystals, m.p. 212°C.; $[\alpha]_D - 13°56'$. Senecifoline is decomposed by alkali into senecifolic acid, $C_{10}H_{16}O_6$, and a new base senecifolinine, $C_8H_{11}O_2N$.

Sesquiterpene Alcohols, Behaviour of, with CrO_3. (*Schimmels' Report, November*, **1908,** 139.) Like maali alcohol, patchouli alcohol yielded an additive CrO_3 compound in red brown needles, m.p. 52–53°C.; *Eucalyptus globulus* oil sesquiterpene alcohol, orange needles, m.p. 78°C.; Ledum camphor forms brick red crystals. Other alcohols, such as santalol, react but the products are difficult to isolate. Some alcohols such as kesso-alcohol, are unchanged by CrO_3.

Shorea ghysbertiana Fat from Sarawak. C. J. Brooks. (*Analyst*, **34,** 205.) The seeds of the tree are locally known as "Enkabang jantong," and are collected by the Dyaks and sent to Singapore. The natives extract the fat, which they esteem highly for dietetic purposes. The native-prepared fat has a slight tallowy odour but a pleasant taste. It is a greyish yellow solid, melting to a golden yellow liquid, sp. gr. 15·5°/100°C. 0·854; m.p. 35° to 43°C.; saponification value, 190·2; acid value, 24·7; iodine value, 30 per cent.; $\eta_{D40°C.}$ 1,4559. The fat prepared in the laboratory by extraction with CS_2 closely resembled this in physical constants, but had an unpleasant taste.

Simarubaceous Plants, Medicinal, Active Principles of. C. Gilling. (*Pharm. J.* [4], **27,** 30, 103.) A survey of the chemical literature of the bitter and active principles of the various drugs belonging to the N.O. Simarubaceæ.

Sium cicutæfolium, Essential Oil of. F. Rabak. (*Mid. Drugg. and Pharm. Review* **43,** 5.) The herb, growing in S. Dakota, gave 0·5 per cent. of bright yellow, sweetish volatile oil, with an odour of caraway and turpentine. Sp. gr. 0·8447 at 22°C.; a_D + 63°40′; solubility in alcohol 90 per cent., 1 : 6 with turbidity; acid value, 0; ester value, 33; acetyl value, 33. The oil contained aldehydes. (See also *Y.B.*, **1892,** 150.)

Sodium Hydroxide contaminated with Arsenic. (*Evans' Analyt., Notes*, **1908,** 36.) Some brands of caustic soda are highly arsenical, containing as much as 25 parts of As_2O_3 per million. The majority of samples contain less than 3 of As_2O_3 per million.

Solanaceous Plants from Brazil, Constituents of. T. Peckolt. (*Berichte Pharm.*, **19,** 31.) *Acnistus cauliflorus.*—The leaves, which are strongly diuretic, contain crystalline acnistine 0·12 per cent., besides oil, and two resin acids. Acnistine is removed by acid from the alcoholic extract, and is very bitter. The berries contain no active principle; the root yields 0·33 per cent. of a saponin. The fresh fruit of *Solanum caavurana* contains 0·107 per cent. of solanine; the fresh leaves 0·03 per cent. The fresh berries of *S. pseudocapsicum* 0·365 per cent.; the leaves of *S. auriculatum* 0·558 per cent., and the berries 0·812 per cent. The dry root of *S. cernuum* gives 0·026 of solanine and 0·166 of cernuine, which is removed from the acid extract by acetic ether. The fruits of *S. aurantiacum* contain no alkaloid; those of *S. peckholdtii* give 0·019 per cent. of solanine; *S. melogena* fruit which are largely cultivated for culinary purposes, contain no solanine; nor do those of *S. sessiliflorum*. *S. gilo raddi* fruit gives 1 per cent. of amorphous bitter principle, but no alkaloids. The root of *S. paniculatum*, which is official in Brazil, contains a trace (0·003 per cent.) of solanine, but the fruits none, but some bitter principle. The ripe fruit of *S. grandiflorum*, var. *pulverentulum*, gave 0·317 per cent. of solanine; when unripe they are nauseous and very poisonous. The fruit of *Cyphomandra calycina* resembles that of the tomato, but it contains more tartaric acid. The fresh leaves of *Datura arborea* give 0·021 per cent. of alkaloids; the bark 0·011 per cent.; the capsules freed from seed 0·025 per cent. (*Y.B.*, **1905**, 115). The fresh fruit of *D. fastuosa* gave 0·37 per cent. of crystalline alkaloid from the fresh fruit and 0·175 per cent. from the fresh leaves. The leaves and bark of *Cestrum lævigatum* are powerfully diuretic; the unripe berries are used in liver affections, and when ripe, as a blue colouring agent. The unripe berries contain an amorphous bitter principle, cestrumide, and saponin, but no solanine. *Brunfelsia hopeana* is a much esteemed drug; the leaves contain 0·086 per cent. of manazine and 0·214 per cent. of brunfelsine; the same bases are found in the bark, which contains 0·06 per cent. of the former, and 0·87 per cent. of the latter. The seeds of *Brunfelsia ramosissima* contain 0·14 per cent. of brunfelsine, but no manazine.

Solanine in Potatoes. M. von Morgenstern. (*Pharm. Zentralh.*, **50,** 296.) Yellow potatoes contain 0·078 per cent. of solanine, red ones 0·0119 per cent. As a rule the maximum of solanine in potatoes used for human food does not exceed 0·0125 per cent. Potatoes used for feeding stock contain from 0·0058 to 0·0115 per cent. Sandy soil gives crops with more solanine than those containing humus. Injured tubers which have healed in the soil are richer in solanine than those uninjured; but if exposed to the air after injury they contain less. Disease does not affect the amount of solanine, nor does putrefaction, nor keeping. The alkaloid is first formed in the tubers, and later on in the leaves. It is produced in greatest quantity during sprouting, and migrates to the growing points of the shoots. Besides serving as a protection to these parts, it also prevents the diosmosis of sugar formed by assimilation. (See also *Y.B.*, **1908,** 185.)

Spike Lavender, Solubility Test for Essential Oil of. (*Schimmels' Report*, *November*, **1908**, 115.) It is suggested to still further increase the stringency of the solubility test for spike oil, from the use of alcohol 65 per cent. as proposed by Parry and Bennett (*Y.B.*, **1904,** 169) to that of alcohol 60 per cent. Genuine spike oil is soluble in 5 to 15 volumes of this solvent, at 20°C., whereas adulterated samples do not dissolve. The test should require the commercial oil to be soluble 1 : 20 in alcohol 60 per cent. at 20°C. The test does not apply to certain steam-distilled oils; but at present the water distillation method is universal in France. Steam-distilled oils should be soluble 1 : 3 to 1 : 5 in alcohol 65 per cent. at 20°C.

Starches, Commercial, Amount of Moisture in. E. N. Gathercoal. (*Proc. Amer. Pharm. Assoc.*, **56,** 887.) The examination of thirty-five samples of various kinds of commercial starch shows that the amount of loss on drying is markedly lower than the figure generally given in text-books, 18 per cent. The highest figure actually obtained was 12·25 per cent. in a mixture of corn and wheat starch, and the lowest 7·8 per cent. in laundry corn starch.

Storax. (*Evans' Analyt. Notes*, **1908,** 39.) The presence of pine-resins and fatty matter was proved in several of the samples examined, the mean results obtained being: Matter insoluble in warm alcohol, up to 4 per cent.; loss at 100°C., 19 to 26 per cent.; ash, up to 0·3 per cent.; cinnamic acid, 9 to 19 per cent. The estimation of the cinnamic acid forms by far the most convenient method for the valuation of this substance.

Surinamine. H. Blau. (*Zeits. Physiol. Chem.*, **58,** 153; *J. Pharm. Chim.* [6], **29,** 254.) Huellenschmidt has isolated a base from certain foreign Papillionaceous plants which Hillier considered to be a methyl-tyrosine. Blau has continued the investigation of this alkaloid, which has been isolated from the bark of *Geoffroya surinamensis* in the form of colourless needles, m.p. commencing with partial decomposition at 233°, and completed at 246°C. This has been named surinamine. When submitted to dry distillation it behaves like tyrosine; at 230–250°C., an oily liquid sublimes which quickly sets to a crystalline mass; at the same time fetid basic substances are formed. The crystalline basic substance is an oxyphenylethylmethylamine. Under these conditions tyrosine gives an oxyphenylethylamine, so that suranamine appears to be a methyl-tyrosine. Like tyrosine, surinamine gives para-oxybenzoic acid when fused with KOH. The position of the methyl group has not yet been determined.

Synthetic Preparations, Characters and Tests for certain. (*Riedel's Report*, **1909,** *Apoth. Zeit.*, **24,** 281.) In the following notes only those characters and tests which differ from, or are not given in, the monographs already published in this country in the B.P. Codex, or elsewhere, have been abstracted.

Acidum diethylbarbituricum; Malourea, *B.P. Codex.* M.p. 188°C.; aqueous solutions faintly acid; it sublimes on careful heating.

Acidum cacodylicum. Dimethylarsenic acid. On adding phosphorous acid to an aqueous solution, the characteristic odour of cacodyl oxide is developed; 0·1 Gm. when treated with 5 c.c. of $SnCl_2$ solution, should not give a brown colour under 10 minutes' contact.

Aethylenum bromatum. Ethylene dibromide. $C_2H_4Br_2$. Sp. gr. 2·170–2·185; b.p. 129–131°C; insoluble in water; crystallizes when cooled below 9°C; when saponified with alcoholic KOH forms vinyl alcohol, water, and KBr. Blue litmus paper should not be affected by water shaken up with an equal volume of the dibromide, and the water should not affect $AgNO_3$. If 10 drops be dissolved in 5 c.c. of alcoholic KOH and a few drops of aniline be added, no unpleasant odour should be perceived.

Aethylmorphinae hydrochloridum. On adding 1 or 2 drops of AmOH (10 per cent. NH_3) to 1 c.c. of a 1 : 10 solution of the salt, the white precipitate which forms is not redissolved on adding another 10 or 15 drops of AmOH; when collected, washed, and dried, it melts at 89–90°C. A solution of a particle of $K_6Fe_2Cy_{12}$ in 10 c.c. of water, treated with a few drops of Fe_2Cl_6, should not at once give a blue colour on adding 1 c.c. of a 1 : 10 solution of the salt, but only gradually a bluish green tint.

Ammonii persulphas. The aqueous solutions react faintly acid. The salt dried at 100° is permanent, but it is readily decomposed in the presence of moisture, evolving O. It precipitates MnO_2 from solution of $MnSO_4$. Crystals of $K_2S_2O_8$ separate out from solution of K_2CO_3 on adding solution of $Am_2S_2O_8$. Its solutions should not show more than a faint opalescence with $AgNO_3$, and should be unaffected by H_2S solution.

Amyl iodiodum. A yellowish liquid, sp. gr. 1·48 to 1·50; b.p. 140–148°C.

Amyl valerianicum. Sp. gr. 0·850–0·860; b.p. 188–190°C.

Arecoline hydrochloride. White, soluble crystals; m.p. 157–158°C.

Arecoline Eserine. A mixture of equal weights of arecoline hydrobromide and eserine sulphate. A white crystalline powder.

Benzoyl guaiacol. Colourless, odourless, tasteless powder, almost insoluble in water; m.p. 56–58°C.; the EtOH solution is not coloured by Fe_2Cl_6.

Bismuth sub-benzoate. White, odourless, tasteless aggregating powder; insoluble in water and in alcohol. If 1 Gm. be ashed the yellow residue redissolved in HNO_3, evaporated to dryness and again heated to redness, the weight of the Bi_2O_3 should not be less than 0·65 Gm. If 1 Gm. of the salt he treated with 3 c.c. of $SnCl_2$ it should not show a dark colour in an hour.

Bromal hydrate. Tribromoaldehyde, $CBr_3{\cdot}COH{\cdot}H_2O$. Colourless or faintly yellow crystals, soluble in H_2O and EtOH; m.p. 53°C. A 1 : 10 solution in C_2H_5OH should give only a faint red colour to litmus paper moistened with it and dried, and should not be immediately affected by $AgNO_3$.

Calcium lactophosphate. The aqueous solution 1 : 20 should not be affected by H_2S solution, and 1 Gm. of the salt in 3 c.c. of $SnCl_2$ solution should not show a dark colour in an hour.

Carbon tetrachloride. Insoluble in water; miscible with EtOH and Et_2O; sp. gr. 1·600 at 15°C.; b.p. 77–78°C. When shaken with equal vols of H_2SO_4 it should not be coloured. When 1 vol. is shaken up with 2 vol. H_2O, the latter should not redden blue litmus paper, nor give more than a faint opalescence with $AgNO_3$.

Quinine-Urea hydrochloride. $C_{20}H_{24}N_2O_2{\cdot}CONH_2NH_2{\cdot}2HCl + 5H_2O$. Hard white crystals, giving a yellow solution with an equal weight of water. M.p. 70–75°C., then solidifying on cooling to a yellow mass; on exposure to air this absorbs water and becomes white. On treating the EtOH solution with Et_2O a salt of different composition is precipitated. Quinine-urea hydrochloride contains 70 per cent. of quinia.

Chlorsalol (ortho- or para-) salicylic acid chlorophenyl ester, $C_6H_4{\cdot}OH{\cdot}COO{\cdot}C_6H_4Cl$. White crystalline aggregating powder, sparingly soluble in water, soluble in EtOH. Orthochlorsalol melts at 55°C., parachlorsalol at 72°C.

Codeine sulphate. In crystals containing 5 mols. H_2O. Readily soluble in water; the solution should not affect litmus, nor give a precipitate with $AgNO_3$.

Caffeine-sodium cinnamate. White amorphous powder, readily soluble in water. The 1 : 20 solution should not be affected by H_2S, nor with $Ba2NO_3$. Fe_2Cl_6 should give a yellowish and not a flesh coloured or violet precipitate. If 0·5 Gm. be boiled with 5 c.c. of $CHCl_3$, the filtered $CHCl_3$ should leave at least 0·2 Gm. of dry caffeine when evaporated.

Metacresol, purified. A clear yellowish to yellowish brown neutral liquid. Gives a clear solution with EtOH and with soft soap. Sp. gr. about 1·040. When distilled about 90 per cent. comes off between 199–204°C.

Diacetylmorphine. A white crystalline odourless powder with a slightly bitter taste ; almost insoluble in water ; readily soluble in hot EtOH, $CHCl_3$ and C_6H_6 ; sparingly soluble in Et_2O ; m.p. 171–173°C. The EtOH solution has an alkaline reaction ; on adding H_2SO_4 it gives the odour of $EtC_2H_3O_2$. With H_2SO_4 containing a little HNO_3 it gives a yellow colour, becoming blood-red on heating. In pure H_2SO_4 it should dissolve without colour. When moistened with HNO_3, sp. gr. 1·4, it dissolves with a yellowish tint, changing to green on standing, and more quickly on warming. It should give no immediate reactions for morphine with K_4FeCy_6 containing a little $K_6Fe_2Cy_{12}$ and with HI.

Di-iodoform. Ethylene periodide C_2I_4. Yellow, faintly aromatic, heavy crystals, insoluble in water, sparingly soluble in EtOH and Et_2O, readily dissolved by $CHCl_3$ and C_6H_6. The solutions are colourless. M.p. about 190°C. It should leave no residue on ignition. When shaken with water, the filtrate should give not more than a faint opalescence with $AgNO_3$. No marked decomposition should occur on warming with NaOH solution, but a slight odour like iodoform is given off.

Iron cacodylate $[(CH_3)_3AsO_2]_3Fe$. The aqueous 1 : 30 solution has an acid reaction and gives no colour with K_4FeCy_6 ; but a dark blue precipitate with $K_6Fe_2Cy_{12}$. With H_2S the aqueous solution precipitates FeS as a dark green precipitate. It should give only a faint opalescence with $Ba2NO_3$, with dilute H_2SO_4 and with $AgNO_3$. If 0·5 Gm. be shaken with 3 c.c. of $SnCl_2$ solution a dark colour should not be given in less than 10 minutes (the test should be made in a fume chamber). On careful ignition it should yield about 17 per cent. of Fe_2O_3.

Syphilis, Serum Colour Reaction for. Schuermann. (*Pharm. Zeit.*, **54,** 309.) A reagent is prepared with phenol 0·5 Gm. ; Fe_2Cl_6 solution, 1 : 20, 0·62 c.c. ; distilled water, 34·5 c.c. One tenth c.c. of the serum to be tested is diluted to 3 or 4 c.c. with physiological NaCl solution and shaken up with 1 drop of perhydrol. Then 0·5 of the reagent is added. Normal blood serum shows a light green colour in the upper layer of the liquids, which either disappears on shaking, or leaves a bluish green shade. Syphilitic serum gives at once a dull brown colour, and on shaking, the mixture appears to be thick.

Tagetes patula, Essential Oil of. (*Schimmels' Report, November*, **1908**, 141.) This Mexican composite cultivated in gardens gives 0·1 per cent. of oil from the fresh flower heads. The golden yellow oil has an odour of fruit esters and olefine terpenes; sp. gr. 0·8856 at 15°C.; $a_D - 5°35'$; ester value, 18·7; acetyl value, 74·3; solubility 1 : 6 in EtOH 90 per cent.

Tangerine, Sweet, and Bitter Orange, Characters of Essential Oils of. E. Berté and G. Romeo. (*Annal. Lab. chim. Cam. comm., Messina*; *Schimmels' Report, April*, **1909**, 5.) *Tangerine orange oil.* Sp. gr. 0·854 to 0·858 at 15°C.; $a_D + 67$ to $+ 73°$; a_D of first 50 per cent. of distillate averages 3° higher than that of original oil.

Bitter orange oil. Sp. gr. 0·852 to 0·856 at 15°C.; $a_D + 88$ to $+ 96$; a_D of first 50 per cent. of distillate at least 3° higher than that of original oil.

Sweet orange oil. Sp. gr. 0·847 to 0·852 at 15°C.; $a_D + 96$ to $+ 98°$; a_D of first 50 per cent. of distillate at least 1°30′ more than that of original oil.

Tartaric Acid and Cream of Tartar, Litmus as Indicator in the Titration of. P. Carles. (*J. Pharm. Chim.* [6], **29,** 381.) The following manipulative procedure enables cream of tartar or tartaric acid to be titrated by acidimetry with greater accuracy than can be attained by the usual methods. According as the standard alkali is either NaOH and KOH, a 1 : 120 solution of pure $K_2C_4H_4O_6$ on $NaKC_4H_4O_6$ is prepared. In this, strips of neutral sensitive litmus paper are immersed for half their length; the dry ends being fixed against the sides of the containing white porcelain capsule. The submerged portion will assume a delicate blue shade, which is the neutral tint to be worked to. Such a control is kept beside the solution being titrated, which is prepared by dissolving the weighed-off $KHC_4H_4O_6$, or the acid, in 100 c.c. of boiling water. Phenolphthalein indicator is added, but merely as a rough guide for the addition of the alkali. A strip of the same litmus paper as used for the control is half immersed in the solution, and titration carried on until the blue shade is reached. The liquid is then well boiled, and a fresh piece of litmus paper used, and the blue tint again matched: when this becomes permanent, the reading of the burette is made.

Tartaric Acid, Determination of, in Presence of Malic and Succinic Acid. L. Gowing-Scopes. (*Analyst*, **33**, 315.) The following is a modification of the method of Ferentzy based on the insolubility of basic magnesium tartrate in alcohol 50 per cent. The amount of tartaric acid in the substance taken should be between 0·5 and 0·10 Gm. If the bulk of liquid be large, or if alcohol be present, it should be evaporated to one-half its original volume. An equal volume of absolute alcohol is then added to the cold liquid; any precipitate formed is filtered out and washed with 50 per cent. alcohol. To the filtrate 10 c.c. of AmOH and 10 c.c. of EtOH are added, the precipitate being collected and washed as before. To the filtrate 10 c.c. of magnesium mixture and 10 c.c. of EtOH are added and allowed to stand overnight. The precipitate is collected, washed with 50 per cent. EtOH, and dissolved off the filter with about 400 c.c. of boiling water, leaving dark-coloured organic impurity insoluble on the filter. The filtrate is evaporated to one-half, cooled, treated with 10 c.c. of H_2SO_4, and diluted to 350–400 c.c. It is then heated to about 90°C. and titrated with standard $KMnO_4$ solution (6·9745 $KMnO_4$ to 1 litre; 1 c.c. = 0·005 Gm. $H_2C_4H_4O_6$) and titrated back with the equivalent oxalic acid solution (13·8793 Gm. per litre).

Taxodium mexicanum, Essential Oil of. (*Schimmels' Report, April*, **1909**, 98.) The Mexican marsh cypress, known as "Sabino," yields an oil resembling turpentine: sp. gr. 0·8685 at 15°C.; a_D − 10°20′; η_D 1,46931; acid value, 0·5; ester value, 5·7.

Teeth, Chemical Composition of. T. Gassmann. (*Zeits. physiolog. Chem.*, **55**, 455; *J. Pharm. Chim.* [6], **28**, 412.) The question has often arisen as to the reason of the greater resistance to pathological influences apparent in the teeth of animals compared with those of man, and why, in human beings, the canine teeth resist decay better than the rest. Chemical examination of human and dogs' teeth show that generally the former are richer in Ca; the wisdom teeth contain the most. Dogs' teeth contain more organic matter and more moisture, and more Na salts, while human teeth have more K salts and more Cl. The wisdom teeth, which are most prone to caries, contain most Ca. The results of a series analysis show the average composition, thus :—

	Human Teeth.				Dogs' Teeth.
	Canines.	Milk Teeth.	Wisdom Teeth.	Teeth at 60 years.	
Moisture	8·09	3·76	6·91	8·17	10·97
Organic matter . . .	22·02	22·84	18·33	21·42	25·99
Ca	29·78	29·59	31·65	30·25	27·33

It appears that teeth which contain the least Ca and the most organic matter resist decay best.

Tephrosia purpurea, Glucoside from. G. Clarke, jun., and S. C. Bannerjee. *Proc. Chem. Soc.* **25,** 16. *Tephrosia purpurea*, N.O. *Leguminosae*, is a common annual weed in Agra and Oudh. The dried leaves extracted with EtOH or acetone yield 2 per cent. of a glucoside, m.p. 180–185°C. It appears to be identical with osyritin ; it yields quercitin and dextrose on hydrolysis.

Tetranthera Citrata, Essential Oil of. (*Schimmels' Report, April*, **1909,** 88 ; *Jaarboek Dep. Land Neder-Md.*, **1907,** 67.) Oils examined at Beutenzorg had the following characters : *Bark oil :* Yield 0·13 per cent. ; sp. gr. 0·856 at 26°C. ; α_{D} + 20°24′ ; aldehydes, 78·5 per cent. *Leaf oil :* Sp. gr. 0·890 at 26°C. ; α_{D} – 12°12′ ; aldehydes, 22 per cent. ; cineol present in quantity. *Fruit oil :* Yield 3·9 per cent. ; sp. gr. 0·876 at 26°C. ; α_{D} + 12°44′ ; aldehydes, 84 per cent., citral, 64 per cent. Oils examined at Miltitz have the following characters : *Bark oil :* Sp. gr. 0·9062 at 15°C. ; α_{D} + 13°58′ ; η_{D20° 1,46595 ; acetyl value, 230·2 ; citronellal, 76·5 per cent. *Leaf oil :* Sp. gr. 0·899 at 15°C. ; α_{D} – 12°2′ ; η_{D20° 1,46426 ; cineol, 35 per cent. ; citral, 6 per cent. *Fruit oils :* Sp. gr. 0·8932 and 0·8849 at 15°C. ; α_{D} + 6°8′ and + 11°30′ ; η_{D20° 1,48141 ; aldehydes with bisulphite 85 and 79 per cent. ; with neutral sulphite, 75 and 74 per cent. Citral and other aldehydes are therefore the chief constituents. (See also *Y.B.*, **1905,** 159.)

Thuja plicata, Essential Oil of. J. W. Brandel. (*Pharm. Review*, **26,** 248.) The yield from young leaves and twigs was 0·8 to 1·4 per cent. of yellow camphoraceous aromatic oil ; sp.

gr. at 25°C. 0·9305 ; α_D at 25°C., $-6·9°$; acid value, 0·5 ; saponification value, 5·7 ; acetyl value, 6·2 ; soluble in all proportions in alcohol 70 per cent. Over 75 per cent. distilled between 190–203°C. ; all fractions were dextro-rotatory, although the original oil was laevo-rotatory. The oil contained a little pinene, much thujone, also fenchone and a borneol ester.

Thuja plicata Leaves, Red Cedar, French, Essential Oil of. (*Schimmels' Report, April*, **1909,** 89.) Dried leaves from Marseilles yielded 1·32 per cent. of oil with a strong odour of thujone : sp. gr. 0·9056 at 15°C. ; $\alpha_D + 5°4'$; $\eta_{D20°}$ 1,45721 ; acid value, 0·8 ; ester value, 16·9. The thujone present is α-thujone. Brandel reports (*supra*) on a laevo-rotatory oil from *Thuja plicata*, whereas that examined by Bleasdale (*Y.B.*, **1907**, 161) like the above, was dextro-rotatory.

Tin, Analytical Notes on, and Reduction of SnO_2. D. B. Dott. (*Pharm. J.* [4], 486, 585.) Errors in text-books on the behaviour of tin salts are noted, and the danger of loss due to volatility of $SnCl_4$ commented on. A method of reducing SnO_2 with H_3PO_2 is given.

Tolu Balsam, Detection of Rosin in. E. Perrot and A. Goris. (*Bull. Sci. Pharm.*, **25,** 636.) Five Gm. of the balsam is treated with 30 c.c. of CS_2 ; the liquid is decanted and evaporated. The residue is then treated with petroleum ether, and the filtered solution shaken up with 1 : 100 $Cu2C_2H_3O_2$ solution ; in the presence of rosin the petroleum ether will have a green colour. The test will detect the presence of 2 per cent. of rosin.

Turpentine, Russian, Essential Oil of, from various Coniferous Oleoresins. — Schkatelow. (*Moniteur. Sci.*, **22,** 217 ; *Schimmels' Report, November*, **1908,** 121.) The oleoresins of the following species of Conifers, collected by the author, gave oils having the characters indicated, on distillation with steam. *Pinus sylvestrus :* Yield 15 to 16 per cent. ; $\alpha_D + 22°$ to $+ 24°$; sp. gr. 0·867 at 15°C. *Pinus abies :* Yield 13·4 per cent. ; $\alpha_D - 13·2°$; sp. gr. 0·873 at 15°C. *Larix sibirica :* Yield 14·13 per cent. ; $\alpha_D - 14·3°$; sp. gr. 0·870 at 19°C. *Pinus cembra :* Yield 6 per cent. ; $\alpha_D + 14·04°$; sp. gr. 0·865 at 15°C. *Pinus taurica :* Yield 20 per cent. ; $\alpha_D - 75·9°$; sp. gr. 0·861 at 19°C. *Abies sibirica :* Yield 28 per cent., $\alpha_D - 35·6°$; sp. gr. 0·8751 at 19°C.

Umbellularia californica, Essential Oil of. (*Schimmels' Report, November*, **1908,** 126.) The leaves gave 5·17 per cent. of yellow essential oil; sp. gr. 0·9386; a_D − 23°37′; acid value, 4·7; ester value, 5·5; acetyl value, 50·8; soluble 1 : 2·2 in alcohol 70 per cent.

Urine, Accurate Determination of Urea in, by Means of Sodium Hypobromite Solution. — Florence. (*Comptes rend.*, **148,** 943.) Uric acid, creatinine, and other substances which interfere with the hypobromite reaction are removed by precipitation with basic lead acetate, and ammonium salts eliminated by boiling with the same reagent for a definite time. Ten c.c. of the urine are treated with 5 c.c. of basic lead acetate solution, sp. gr. 1·32; and filtered after standing for 30 minutes. After thorough washing, the bulked liquid is boiled for 70 minutes, which decomposes all the ammonia salts, but does not affect the urea. The cooled liquid is then made up to 100 c.c. In an aliquot part of this solution the urea is determined gasometrically, in the usual manner in the ureometer, with sodium hypobromite reagent. (See also *Y.B.*, **1907, 17.**)

Urine, Detection of Indican in. — Salkowski. (*Apoth. Zeit.*, **23,** 863.) To 8 c.c. of urine add 1 c.c. of $CuSO_4$ solution 1 : 10, 1 c.c. of HCl, sp. gr. 1·19 and several c.c. of $CHCl_3$. On shaking up, the latter is coloured blue if indican be present.

Urine, Determination of Ammonia in. G. C. Mathison. (*B.M.J.*, **1, 1909,** 715.) About 15 Gm. of neutral $K_2C_2O_4$ is shaken for 2 minutes with a mixture of urine 25 c.c. and water 50 c.c. The total acidity of the mixture is then titrated with N/10 NaOH solution, with phenolphthalein indicator. About 5 c.c. of commercial formalin, previously neutralized, is then added, and the acids liberated thereby from combination with NH_3 again titrated with N/10 NaOH. Each c.c. of the latter titration is equivalent to 0·0017 Gm. NH_3 or 0·0014 Gm. N.

Urine, Determination of Glucose in. F. Repiton. (*Bul. Soc. Chim.* [4], **3,** 1056; *Comptes rend. Soc. biolog.*, **1908,** 861.) K_2CrO_4 is used as indicator; in the presence of excess of AmOH, the titration being performed in the usual manner by adding the urine to a boiling solution of any standard alkaline copper reagent. An intense yellow colour marks the end reaction.

Urine, Microchemical Detection of Urotropine in. G. Denigès and — Labat. (*Répertoire*, **21**, 61.) A drop of the urine is placed on a micro-slide in the centre of a similar drop of the following reagent, KI, 8; I, 6; H_2O to 150. When diffusion is complete, the mixture, without a cover-glass, is examined under a low power. In the presence of urotropine, fern leaf crystals (which are figured) are seen. A less sensitive reaction is obtained by adding 0·5 or 1 c.c. of Tanret's reagent (potassium mercuric iodide) to 5 or 10 c.c. of the urine. In presence of urotropine, a precipitate of micro-hexagons, more or less aggregated, forms in a few minutes. This is less sensitive than the above.

Urine, Zinc Ferrocyanide as a Clarifying Agent for. C. Coirrez. (*Annal. Chim. analyt.*, **13,** 97.) Zn_2FeCy_6 in precipitating carries down the colouring matter of urine, so that it affords a clear filtrate which does not cloud in the polarimeter tube. It eliminates biliary pigments, methylene blue, blood, albuminoids and urobilin, but unlike Patein's reagent of mercury nitrate, does not precipitate pentoses nor β-oxybutyric acid. It must be remembered that urine clarified by Zn_2FeCy_6 has itself the a_D — 0·2° or 0·4°, so this correction must be made. The proportions to use are: Urine, 50 c.c.; K_4FeCy_6 solution (150 Gm. per litre), 5 c.c.; $ZnC_2H_3O_2$ (300 Gm. per litre) 5 c.c.

Vanillin as a Reagent for Antipyrine and Cryogenine. C. Primot. (*Bull. Sci. Pharm.*, **16,** 270.) A reagent is prepared with vanillin, 1; HCl, 3; C_2H_5OH 95 per cent., 100. If a small particle of antipyrine, moistened with 2 c.c. of this, be evaporated to dryness on the water-bath, a deep orange ring and deposit is formed. A transient yellow colour may be detected with as little as 0·00095 Mgm. of phenazone. Cryogenine under like conditions gives a yellowish green colour. Pyramidone does not give any reaction, so that the test may be employed to detect the fraudulent admixture of antipyrine with pyramidone: 0·005 Mgm. of the former may be detected in 0·10 Gm. of the latter. (See also *Y.B.*, **1905,** 174; **1906,** 65.)

Vinegar, Detection of Mineral Acids in. — Utz. (*Schweiz. Woch. Chem. Pharm.*, **47,** 134.) About 10 c.c. of the vinegar is heated with 4 or 5 Gm. of cane sugar on the water-bath. After cooling, the liquid is shaken out 2 or 3 times with ether; the ether is evaporated at a low temperature and the residue thoroughly dried on the water-bath. To this a drop of 1 per cent. solution of resorcin in HCl, sp. gr. 1·19, is added. In the presence of a trace of mineral acid in the vinegar; a pink to cherry red colour will be obtained. If the vinegar be pure, a lemon yellow tint, or no colour results. The reaction is due to the presence of inversion products, soluble in ether, formed by the action of mineral acids on sucrose.

Water, New Reaction for Nitrites in. A. Rochaix. (*L'Union Pharm.*, **50,** 62.) An aqueous solution of "neutral red," also known as "toluol red," 0·2 per mille, is a sensitive reagent for nitrites in drinking water, capable of detecting 0·05 Mgm. of HNO_2 in 1,000 c.c. of water. To 20 c.c. of the reagent, about 10 c.c. of the water and 1 to 3 c.c. of 25 per cent. H_2SO_4 are added. On stirring the red colour changes, and ultimately becomes blue. The H_2SO_4 should not exceed the above strength, for the strong acid gives a blue colour in the absence of nitrites. Alkaline waters at first give a yellow colour, but this soon passes to blue if nitrites are present. The other impurities present in drinking water do not affect the test.

Ylang ylang and Cananga Oil, Javan. A. W. K. de Jong. (*Teysmannia*, **1908,** 578; *Schimmels' Report*, *April*, **1909,** 26.) Javan oil distilled from *Cananga odorata* flowers has only about one-tenth the commercial value of Manila oil from presumably the same botanical source. Bacon (*infra*) has shown that the ester value of good Manila oil is above 100. The author has been unable to obtain oil with a saponification value higher than 23·8, even with distillations conducted by himself, and the product shows other differences from the Manila product. This is attributed to difference of climate, and possibly to slight botanical variation in the trees. Schimmels consider that the difference may also be due to the method of distillation, the Javan flowers being crushed and then slowly distilled in water; this would naturally tend to saponify the esters present. Better results would be expected from a more rapid distillation with live steam of the unbruised flowers, or by supporting the flowers on a perforated false bottom and distilling over water with the steam generated therefrom.

Ylang ylang, Essential Oil of. R. F. Bacon. (*Philippine J. Sci.*; *Schimmels' Report*, *November*, **1908,** 128.) Interesting details of the local methods of distillation are given. The following data were obtained from the examination of 23 samples of first-class oils: Sp. gr. $\frac{30°C.}{4°C.}$ 0·911 to 0·958; $\eta_{D30°C.}$ 1,4747 to 1,4940; $\alpha_{D30°C.}$ $-27°$ to $-49·7°$; ester value, 90 to 138. Thirty-six samples of second quality oil had the characters: Sp. gr. $\frac{30°C.}{4°C.}$ 0·896 to 0·942; $\eta_{D30°C.}$ 1,4788 to 1,5082; $\alpha_{D30°C.}$ $-27·4°$ to $-87°$; ester value, 42 to 94. In first-class oils the ester value is mostly over 100, the true acetyl value 74; the η_D is rarely above 1,4900; and the α_D rarely above $-45°$. In the inferior cananga oils the ester value rarely exceeds 80; the true acetyl value is about 42; the η_D approaches 1,5000 and the α_D is $-60°$ or more. Distillation of inferior oils *in vacuo* does not improve them. The statement that champaca flowers are used to adulterate ylang ylang flowers for distillation is erroneous, for champaca flowers are more costly.

The small quantity of pinene present in the genuine oil is probably due to the use of immature flowers, for none could be found in a distillation from selected matured blooms; but the oil distilled from immature flowers only, resembled turpentine and bananas in odour. A specially rectified dextro-rotatory turpentine oil, flavoured with peppermint, is used in the Philippines as an adulterant, being sprayed on the blooms before distillation. Genuine ylang ylang oil should not give more than 1 c.c. of distillate below 65°C when 100 c.c. is fractionated under 10mm. pressure. Alcohol and coconut oil are also used as adulterants. First quality ylang ylang oil containing 3 per cent. of coconut oil gives an opalescent solution 1 : 2 with alcohol 90 per cent.; second grade oils are also partially insoluble in this proportion. The difference is more marked with weaker alcohol. Pure oil distilled *in vacuo* leaves about 5 per cent. of non-volatile residue.

In addition to the constituents already isolated, formic acid and safrol, or isosafrol (probably the latter), were found. Reaction for aldehydes was obtained, but none could be isolated.

Ylang ylang Oil, Malagasy. (*Schimmels' Report, November,* **1908,** 135.) The oil was considered not to be equal to the best Manila brands, although it had a fine aroma. It was pale yellow, with a faint bluish fluorescence. Sp. gr. 0·9577 at 15°C.; α_D $-49°55'$; $\eta_{D20°C}$. 1·51254; acid value, 18; ester value, 113·2; acetyl value, 160·2; soluble 1 : 1·5 of alcohol 95 per cent., opalescent with more.

Zinc Permanganate, Preparation of, for Pharmaceutical Use. G. Heikel. (*Amer. J. Pharm.*, **80**, 586.) To a saturated solution of K_2MnO_4, an equivalent quantity of $AgNO_3$ in concentrated solution is added. The mixture is kept cold on ice for two hours, and the precipitated Ag_2MnO_4 collected on a filter pump. It is then washed with cold water until free from KNO_3, collected, and dried at below 100°C. To a known weight of this Ag_2MnO_4, heated in five to eight times its weight of water on a steam bath, the calculated equivalent of $ZnCl_2$ is added, and the heating continued until reaction is complete. This is determined by removing a small portion of the solution, decolourizing it with HNO_3 and formaldehyde, and testing in two portions for Ag and Cl. Only the slightest trace of either should be present. The AgCl is then filtered out, and the solution of $ZnMnO_4$ evaporated to dryness.

MATERIA MEDICA

PART II

MATERIA MEDICA

Acetanilide, Caffeine and $NaHCO_3$ Mixtures, Toxicity of. Worth Hale. (*Internat. Congress Applied Chem.*; *Pharm. J.* [4], **28,** 869.) Instead of decreasing the toxicity of acetanilide as supposed, the addition of caffeine greatly increases it. $NaHCO_3$ alone, on the other hand, has a well-marked diminishing effect on the poisonous action of acetanilide. It was found that the relative toxicities could be expressed by the following numbers :—Acetanilide *plus* sodium bicarbonate, 100; acetanilide alone, 128; acetanilide *plus* caffeine *plus* sodium bicarbonate, 150; acetanilide *plus* caffeine, 210.

Aconite and Belladonna, Physiological Antagonism between. H. Speirs. (*B.M.J.*, **1908, 2,** 372.) A suggestive case, illustrating the antagonism of aconite and belladonna, is recorded. A dose of liniment of aconite, belladonna, and chloroform, equivalent to more than 50 grains of aconite root, and 40 minims of liquid extract of belladonna, was swallowed by misadventure. Although for some time in a most critical condition, the patient ultimately recovered. Strychnine was administered hypodermically, with saline brandy enemata; when improvement in the condition was evident, morphine was injected to calm the delirium.

Almatein. G. Astolfoni. (*Boll. Chim. Farm.*, **1908,** 368; *J. Pharm. Chim.* [6], **28,** 163.) This name has been given to a condensation product of haematoxylin with formaldehyde, which, although practically non-toxic and non-cumulative, is a powerful antiferment and antiseptic, exercising its action solely in the alkaline secretion of the intestines, since it is insoluble in the acid gastric secretion. It occurs in a fine, brick-red, silky, tasteless and odourless powder; practically insoluble in cold water; readily dissolved in organic solvents; decomposed by alkalies, giving violet solutions of haematein. It decomposes at 110-120°C. It is a useful remedy for diarrhoea of infants, and for dysentery and enteritis of adults. For adults the dose is 60 to 90 grains per diem; best given in tablets each containing 7½ grains. For children the dose is much less, and for them a suspension or emulsion containing 1 per cent. of sodium carbonate is the best form of administration. Almatein is also preferable to all other antiseptic and astringent powders for surgical use, since it prevents the formation of pus and rapidly cures wounds. For this purpose it may be used as a dusting powder, as a 1 : 5 ointment with vaseline, or on gauze.

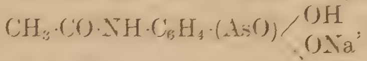
Aloes, Barbados. W. G. Freeman. (*Pharm. J.* [4], **27**, 768.) The process of preparing aloes from *Aloe vera* leaves in Barbados is described, and interesting details are given of this disappearing industry.

Antimorphine. M. Leprince, junr. (*Bull. Sci. pharm.*, **14**, 270.) This German proprietary article, introduced as a morphine remedy, is claimed to be prepared from *Argemone mexicana*. J. O. Schlotterbeck (*Y.B.*, **1902**, 36) has shown that the plant contains protopine but no morphine. The author examining the roots imported direct from Mexico confirms the absence of this base. W. Dulière has found morphine in "antimorphine." It is evident, therefore, that this so-called morphine substitute is not such, nor is it solely prepared from the Mexican drug.

Aperitol. — Hammer and — Vieth. (*Apoth. Zeit.*, **23**, 690.) Valeryl-acetylphenolphthalein is put forward under this name as an aperient which will not occasion colic even in susceptible patients. It is put up in sweetmeat form, each containing 3 grains of aperitol; one of these is a dose, but considerably more may be taken. It is specially suitable for children. It is stated that continued use does not lessen the effect.

Apiols and other Constituents of Parsley Fruits, Physiological Action of. L. Lutz and G. Oudin. (*Bull. Sci. pharm.*, **16**, 65.) Crystalline apiol is found to be by no means the sole, and probably not even the chief, toxic constituent of parsley fruits. The following are the lethal doses of these substances and of liquid commercial apiols, for 1 kilo. of guinea-pig. Crystalline apiol, 0·5 Gm.; essential oil, 0·9 c.c.; apiolines, about 1 c.c.;

myristicin, above 2 c.c.; liquid yellow apiol, 0·85 c.c.; liquid green apiol, 1 c.c.; white apiolines, 1 c.c. Since liquid apiol contains only 6 per cent. of crystalline apiol, if this were the sole toxic constituent the lethal dose of apiol would be over 8 c.c. The low toxicity of myristicin is also noteworthy, since this is the main constituent of French apiols; yet these apiols are fully active. The symptoms produced by crystalline apiol are quite distinct from those caused by apiol. The toxicity of the various constituents of parsley fruits is in direct ratio to their volatility. In the case of those of the above substance which are not of definite composition, the most volatile fraction is also the most toxic.

Arsacetine. (*Apoth. Zeit.*, 23, 582.) Sodium para-acetyl-aminophenyl arsinate,  $CH_3{\cdot}CO{\cdot}NH{\cdot}C_6H_4{\cdot}(AsO){<}{\genfrac{}{}{0pt}{}{OH}{ONa}}$, has been introduced into medicine as an arsenic-containing drug of low toxicity. It occurs as a light, crystalline, colourless powder containing 4 mols. H_2O; soluble 1 : 10 in cold water. It contains neither As_2O_3 nor As_2O_5. The solutions are perfectly stable at 100°C., and may be sterilized under pressure at 130°C. without decomposition. The 1 : 10 solution should be clear, colourless and barely acid; and should not be affected by dilute HCl. On adding 1 c.c. of dilute HCl and 10 drops of solution of $NaNO_2$ to 20 c.c. of a 1 : 20 solution of the salt and filtering the mixture, no red colour should be produced in the filtrate with solution of β-naphthol. If 20 c.c. of magnesia mixture be added to a 1 : 20 solution of arsacetine, no turbidity nor precipitate should appear in 2 hours. When crushed and heated to 110–120°C. for 4 hours, the loss in weight should be 20 per cent.

Arsacetine is suggested for use for the treatment of diseases due to blood parasites, such as sleeping sickness, malaria, and for syphilis and pellagra, for which it is given as a 1 : 10 solution by hypodermic or intravenous injection; for this purpose the fact that the solutions can be sterilized is an obvious advantage. Internally it may be prescribed to adults in doses $\frac{3}{4}$ grain three or four times in 24 hours, and twice only in the same period to children.

Arsenic Compounds, Modern. John Humphrey (*Pharm. J.* [4], 28, 83.) The chemical constitution, properties and therapeutic action of the following arsenic compounds are discussed: Atoxyl, sodium aminarsonate; soamin, sodium aminarsonate; arsacetin, sodium acetarsonate; and orsudan, sodium acetarsonate.

Arsenic, Organic Compounds of, for Therapeutic Use. W. H. Martindale. (*Seventh Internat. Congress of Applied Chemistry; Pharm., J.* [4], **28,** 867.) After a complete historical review of these preparations, the nomenclature is dealt with. Arsenic acid, an inorganic substance, is represented by the formula $AsO(OH)_3$; when one hydroxyl group is replaced by an organic radicle, an arsonic acid results, $AsO(OH)_2R$, sodium methylarsonate, for example, being $AsO{\cdot}OH{\cdot}ONa{\cdot}CH_3$; if two hydroxyl groups of arsenic acid are replaced by organic radicles, an arsinic acid results, $AsO{\cdot}OH{\cdot}R'R^2$, cacodylic acid (dimethyl arsinic acid), $ASO{\cdot}OH{\cdot}(CH_3)_2$, being an example of this group. Details are given of some forty organic compounds, the As content of which ranges from 10 to 50 per cent.; results of physiological tests made in the University of London by Dr. A. D. Waller with certain new compounds are also detailed.

Asiphyl. E. Mameli and J. Ciuffo. (*Apoth. Zeit.*, **23,** 771.) This name is given to mercury para-anilarsinate corresponding to atoxyl, the sodium salt of that acid. It is a white powder, turning greyish on exposure to air. Sparingly soluble in water; readily dissolved by glycerin and by liquid paraffin. It is claimed to be a useful antisyphilitic, but its therapeutics and posology have not yet been fully worked out.

Asquirrol. (*Pharm. Zentralh.*, **49,** 858.) Is the trade name for mercury dimethylate, containing 56 per cent. of Hg. It is soluble in water, and is introduced for use by injection of the aqueous solution for the treatment of syphilis. It is put on the market in sterilized glass vessels, each containing 1 c.c. of a 5 per cent. solution.

Belladonna and Scopola, Distinguishing Morphological Characters of. H. Kraemer. (*Proc. Amer. Pharm. Assoc.*, **56,** 819.) The differences in histological characters are minutely described and the distinctive features illustrated.

Brometone. R. Ollershaw. (*Med. Chron.; Nouveaux Remèdes.*) This is the analogue of chloretone, and is tribromotertiary butyl alcohol. In epilepsy it gives good results in doses of 6 grains three times daily; and is an efficient hypnotic for use in mitral affections in doses of 30 grains every night.

Bromovalidol. G. Schwersenski. (*J. Pharm. Chim.* [6], **29,** 115.) Validol is menthyl valerianate; bromovalidol is the same with an addition of NaBr. It is prepared in tablet form, each containing NaBr, 15 grains; MgO, 1½ grains; validol, 5 drops. It is given as a hypnotic and nervous sedative in doses of two tablets.

Calcium Salts in Various Morbid Conditions. A. P. Luff. (*B.M.J.*, **1909, 1,** 261.) The utility of calcium salts is well established in various affections due to deficient coagulability of the blood, giving rise to a tendency to serous haemorrhages through the capillary wall. Such a condition is often the cause of what has been called "lymphatic headache." Many of these cases have been successfully treated by the administration of calcium lactate, 15 grains dissolved in 1 ounce of chloroform water, with the addition of half to one minim of tincture of capsicum. This should be taken three times daily, one hour before meals. This time is important, since it prevents the calcium being precipitated by the phosphates or other constituents of the food, which would occur if taken nearer meal times. The lactate may cause constipation. If so, this must not be treated with the usual mineral laxatives consisting of sulphates. The most suitable laxative is an infusion of senna pods, taken at bedtime. The treatment has been quite successful in 82 per cent. of the cases of lymphatic headache treated; the mental lassitude was removed, and physical condition improved. Seventy-eight per cent. of the cases of chilblains, due to defective blood condition, were cured. Eight cases of boils accompanied by slight oedema of the hands and feet were all cured. Six out of eight cases of urticaria in lymphatic patients were also cured, also four out of six cases of flushing of the face; in a similar condition considerable benefit also attended the administration of the lactate in all the cases of aneurysm of the aortic arch in which it was given, and marked benefit followed its use in three cases of haemaglobinuria. Other cases treated with success include: Oedema of the feet of neither renal nor cardiac origin; vesicular and bulbous eruptions; erythema; lichen planus; gouty pruritus; and perspiring hands and feet. No bad symptoms were observed in any one of the total 121 cases above recorded, and in only three cases not included therein was indication of commencing thrombosis indicated. In one of these there was a definite slight venous thrombosis in the calf; in the second slight numbness of the arms and legs, with tingling, occurred; and in the third, noises in the ear, with deafness, were produced. These symptoms rapidly subsided after ceasing the administration of the lactate. Calcium lactate is to be preferred to calcium chloride for internal administration, since it has scarcely any taste, and is free from irritant action. Calcium chloride, the salt often prescribed, is very nauseous, and is irritant to the stomach. The solubility of the lactate, 1 : 15 in water, is sufficient to allow it to be prescribed as indicated above.

Calcium Salts for Convulsions. — Silvestri. (*Gazz. osped.*; *B.M.J.*, *Epit.*, **2, 1908,** 92.) On the hypothesis that various convulsive types of diseases are, in part, due to deficiency of calcium in the blood, the treatment of such cases by the administration of calcium has been successfully nstituted. Benefit has accrued from this treatment in a case of hystero-epilepsy, in one of tetany occurring in successive pregnancies, and in convulsions in a rickety child. The hypophosphite, lactate or chloride of calcium may be given.

Camphoric Acid Inert. V. Tyrode. (*Bost. Med. Surg. J.*; *Nouv. Remèdes*, **26,** 130.) Experiments on animals show that camphoric acid has no specific action. It behaves exactly like other organic acids which are not decomposed in the organism. Its sodium salt acts like any other neutral salt, such as sodium sulphate. It has no stimulant or anhydrotic action.

Cascara Sagrada, English grown. (*Kew Bulletin*, **1908** [10]; *Chem. & Drugg.*, **74,** 156.) Seed sown at Kew in December, 1891, germinated in the following March, and has since grown well. The largest tree is now 21 feet high, 18 feet in the spread of its branches, and the trunk is 24 inches in circumference. The trees are growing in shallow, sandy soil. In view of the diminishing supply from wild trees in the U.S.A. and the increasing price of the bark, it is suggested that a remunerative industry might be established in Western Ireland and Scotland by the growth of the tree. The trees at Kew are perfectly hardy. Bark from the Kew trees has been found by Jowett to yield an extract equal in activity to that from American bark.

Cerium Oxalate in Gastric and Intestinal Affections. J. C. MacWalter. (*Med. Press*, **138,** 404.) Cerium oxalate, especially when combined with bismuth, is a valuable remedy in gastric ulcer and other inflammatory affections of the mucous membrane. It should not be given in pill form, but as a powder, such as cerium oxalate, 2 grains; bismuth (subnitrate or oxycarbonate) 10 grains; or it may be added to the usual bismuth mixture. In addition to its specific action, it prevents the constipation and anorexia which sometimes follow the bismuth treatment.

Cocaine Substitutes, Anaesthetics Recommended as. C. N. Le Brocq. (*B.M.J.*, **1, 1909,** 783.) The substances investigated were: Stovaine, novocaine, tropacocaine, β-eucaine, alypine, β-eucaine lactate, nervanine, holocaine hydrochloride, acoine new orthoform, and anaesthesine. Of these novocaine was found to be most satisfactory for general use; its anaesthetic action is equal to that of cocaine, while its toxicity and general destructive power on the tissues are very much less. It is freely soluble in water, and may be sterilized at 115°C. if necessary.

Colchicum Flowers and Corms, Fresh and Dried, Relative Strength of Preparation of. E. Déjean. (*J. Pharm. Chim.*, **29,** 279.) Fresh colchicum flowers afford stronger galenical preparations than fresh corms, and much stronger than either dried flowers or dried corms. Dried flowers also give more active preparations than dried corms. The strong alcoholature or 1 : 1 mother tincture of the fresh flowers has the relative therapeutic superiority over the tincture prepared from dry flowers as 1 : 12·8. The former contains 0·768 *per mille* of alkaloids; a similar mother tincture of fresh corms contains 0·690 *per mille* of bases. The relative therapeutic superiority of the mother tincture of fresh corms, compared with the tincture of dried corms, is as 1 : 19. Consequently galenical preparations of fresh organs of colchicum should be prescribed, and of these, those of the flowers are preferable to those of the corms. (See also p. 107.)

Copaiba paupera, Dextro-rotatory Oleoresin from. C. Hartwich and A. Jama. (*Schweiz Woch. Chem. Pharm.*, **47,** 373.) The oleoresin of *Copaiba paupera*, a fine tree indigenous to the province of Velasco in Bolivia, is remarkable as being the only known South American copaiba which is dextro-rotatory. In this respect it resembles "Illurin" or African copaiba. The colour of the "balsam" is yellowish-brown; in consistence it resembles Maracaibo balsam. Sp. gr. 0·998 at 15°C.; $a_{\mathrm{D}} + 36^\circ$; $\eta_{\mathrm{D}20^\circ}$ 1522; acid value, 89·7; cold saponification value, 97·25; hot saponification value, 101·5. It gives a positive reaction with the $H_2SO_4 + HNO_3$ test for gurjun balsam. The resin acids are amorphous, and the essential oil is markedly dextro-rotatory. A full description of the method of collecting the balsam is given and illustrated.

Cotarnine cholate. (*Pharm. Zeit.*, **54**, 242.) Crystalline cholic acid, 20; cotarnine, 10; and distilled water, 100; are shaken together until the solution no longer has an alkaline reaction. The insoluble residue is filtered off, and the filtrate evaporated below 45° to dryness, *in vacuo*. The resulting salt is very soluble in water and in alcohol: m.p. 118–120°C., with decomposition. It is introduced as a styptic for gynaecological use.

Desalgin. C. L. Schleich. (*Apoth. Zeit.*, **24**, 194.) A powder containing 25 per cent. of $CHCl_3$ combined with an albuminoid substance, has been introduced for the internal administration of $CHCl_3$ as an analgesic and intestinal antiseptic. Dose, half a teaspoonful.

Digipuratin. (*Pharm. Zeit.*, **53**, 696.) This digitalis product is stated to be accurately dosed in physiological activity, and s prepared in tablet form. Each tablet is equivalent to $1\frac{1}{2}$ grains of active digitalis leaf. It is insoluble in water, but is dissolved by alkalies. It contains digitoxin and digitalin.

Diplosal (*Apoth. Zeit.*, **23**, 401) is the salicylosalicylic acid $OH{\cdot}C_6H_4{\cdot}COO{\cdot}C_6H_4{\cdot}COOH$. It occurs in colourless, slightly bitter, odourless needles, m.p. 147°C. Almost insoluble in water; soluble in alkalies and in carbonates, by which it is, however, saponified at ordinary temperatures. It is prescribed for those affections for which the salicylates are given, in single doses of 15 grains, up to 75 or 80 grains per diem.

Drugs, Crude, Sampling of, for Analysis. F. R. Eldred. (*Proc. Amer. Pharm. Assoc.*, **56**, 831.) Attention is directed to the importance of careful sampling of crude drugs for assay. Probably the errors due to defective sampling are far greater than discrepancies shown by different analytical processes. Where a consignment of a drug occurs in several parcels, representative portions should be withdrawn from different parts of each one; these should be bulked, powdered, mixed, and the powder quartered; the two opposite quarters rejected; the other two mixed, and again quartered, and so on until a convenient bulk is obtained. All crude drugs must be sampled by hand. With such drugs as asafetida, the first drawings should be beaten to a pulp and then subdivided. It was stated in the discussion that very small samples are best powdered in a Grumbach centrifugal mill, preferably power-driven.

Drugs, Fresh and Dried, Relative Pharmacological Strength of. E. Déjean. (*J. Pharm. Chim.*, **29,** 280.) Tinctures of alkaloidal drugs, made from dried material, are, as a general rule, of greater relative pharmacological strength than strong mother tinctures, 1 : 1, made from the fresh drug. This is so with digitalis leaves, aconite root, belladonna leaves, and hyoscyamus leaves. In some instances, however, where marked change occurs in drying, the preparation made with the fresh material is relatively stronger. This is so with aconite leaves, conium leaves, and (as stated on p. 105) with colchicum flowers and colchicum corms. In the case of hyoscyamus the 1 : 1 mother tincture was found to contain 0·375 *per mille* of alkaloids, and the tincture of the dried leaves 1·555 *per mille*, so that the relative pharmacological superiority of the latter over the former was as 1 : 3·08. (See *Y.B.*, **1902,** 238.)

Drugs, Necessity of the Botanical Identification of, before Chemical Examination. E. M. Holmes. (*Internat. Congress Applied Chem.*; *Apoth. Zeit.*, **24,** 409.) Emphasis is laid on the importance of establishing the botanical identity of drugs, and the freedom from admixture, before commencing a chemical investigation. The services of the skilled botanist and histologist should always be sought by the chemist. In the past, much confusion and needless subsequent work has been caused by neglect of this obvious precaution. In many genera from which drugs are derived, botanical identification is of special importance.

Eubornyl. F. Luedy. (*Pharm. Zentralh.*, **49,** 625.) Bornyl *a*-bromo-isovalerianate is a colourless, syrupy, fragrant liquid; b.p. 175–178°C., with partial decomposition; insoluble in water. It is prescribed as a nervine sedative.

Eulatine not a Definite Compound. F. Zernik. (*Apoth. Zeit.*, **24,** 52, 137.) Eulatine is the name given to a so-called phenazone amidobromobenzoate. Zernik finds that it is a mere mixture, separable by solvents into its constituents, phenazone, ortho-amido-benzoic acid, and para-bromobenzoic acid. It contains no amidobromobenzoic acid.

Eulaxans (*Pharm. Zeit.*, **53**, 759) is a phenolphthalein aperient, consisting of 1 molecular weight of phenolphthalein, with 2 molecular weights of NaOH. In the acid gastric secretion free phenolphthalein is liberated, which becomes active when again combined with alkali in the intestines. It is prepared for use in the form of tablets.

Euphylline. P. Dessauer. (*Apoth. Zeit.*, **23**, 599.) Euphylline is a compound of theocine and ethylene-diamine, which is very soluble in water ; it is a very powerful diuretic. It may be administered as follows : In *suppositories* each containing 6 grains of euphylline, 2 to 4 to be used in 24 hours. As a *rectal injection*, 1 Gm. of euphylline dissolved in water is mixed with 120 Gm. of salep mucilage to make 2 to 4 rectal injections. As *intra-muscular injection*, 1·5 c.c. of a 24 per cent. aqueous solution is used 3 or 4 times daily. Internally, the following *mixture* may be given in doses of one tablespoonful every two hours : Euphylline, 1 Gm. ; distilled water, 160 Gm. ; simple syrup, tincture of bitter orange, of each 20 Gm.

Euporphine (*Bull. Sci. pharm.*, **16**, 297) is the name given to apomorphine bromethylate. It has the physiological action of apomorphine, without its disadvantages. It has no irritant action on the stomach or the heart, is stable, and readily soluble in water. Its dose is $\frac{1}{6}$ to $\frac{5}{8}$ grain.

Euresol. (*Pharm. Zeit.*, **54**, 337.) Resorcin mono-acetate is thus named. It is a reddish-yellow, pleasant smelling oil, insoluble in water ; soluble in oils, fats, acetone, and alcohol. Employed externally for skin affections, in acetone solution, or as an ointment, also as a stimulant addition to hair washes. To be protected from light.

Fennel Fruits, Inferior. J. A. Jennings and H. Rodwell. (*Pharm. J.* [4], **28**, 147.) Attention is directed to the large quantity of inferior fennel fruits offered on the market, only one sample in seven examined being satisfactory.

Filicone. (*Apoth. Zeit.*, **1908**, 23, 559.) This anthelmintic is claimed to be the active principle of *Aspidium spinulosum*. It is employed in solution in castor oil. The dose for an adult is 230 grains of this solution, containing 30 grains of filicone.

Gentian Root, Powdered, Test for. E. W. Bell. (*Pharm. J.* [4], **27**, 255.) When genuine powdered gentian is shaken up with water, the amount of water absorbed is considerable and the sediment bulky, much more so than when the usual adulterants are present. If ¼ oz. of the powder is added to 5 fl. oz. of water in a graduated bottle and shaken at intervals for a day or two, the sediment should reach from the 2½ to 3 oz. graduation. If less than this, foreign vegetable matter will be present.

Green Extracts, Microscopical Identification of. H. G. Greenish and R. E. Griffiths. (*Pharm. J.* [4], **27**, 834.) Twenty Cgms. of the extract are triturated in a mortar with 5 c.c. of water, transferring the turbid liquid to a conical centrifuge tube, centrifugating and pouring off the supernatant liquid, repeating the treatment with water, treating the residue with aqueous chloral hydrate solution (5 in 2), and again placing in the centrifuge. The final deposit is mixed with one or two drops of the chloral hydrate solution or glycerin, and small quantities transferred, by means of a small pipette, to a microscope slide. In certain cases bleaching may be necessary. The whole field is carefully examined under the microscope for characteristic tissue. Belladonna, henbane, lettuce, foxglove, hemlock, and aconite extracts have been thus examined, and the characteristic structural fragments isolated from them are illustrated. The method enables impurities, accidental or otherwise, to be detected.

Helkomen. (*Apoth. Zeit.*, **23**, 600.) This name has been given to basic bismuth dibromo-β-oxynaphthoate, the preparation of which has been patented in Germany. It is a fine, odourless powder, insoluble in water; it may be heated to 110°C. without decomposing. It is one of the many substitutes for iodoform, and is used as such either undiluted, or in 10 or 20 per cent. ointments and powders.

Hydropyrine. F. Zernik. (*Apoth. Zeit.*, **23**, 529.) Hydropyrine is put on the market as the sodium salt of aspirine, with the claim that it is neutral and soluble in water. As a matter of fact, both the powder and the tablets examined were not entirely soluble in water; and the reaction of the solutions was markedly acid. But analysis showed that the salt was probably originally sodium acetyl-salicylate, as claimed. This, however, is not a stable salt, and soon liberates acetic acid; in fact, the sodium salt is much less stable than aspirine itself.

Hyoscyamus, Wild, Tincture of Fresh Herb. E. W. Pollard. (*Chem. & Drugg.*, **73**, 388.) Henbane grows luxuriantly in a few spots in the Isle of Wight. About 7 lb. of the herb, which was in the pink of condition, during the first week in June, weighed 4 lb. and contained 80 per cent. of water, after removal of stalk and partial drying from a day or two's exposure. The dry material yielded 0·16 per cent. of alkaloid. A tincture of the fresh herb was made by Barclay's method (*Y.B.*, **1902,** 238), 2½ pints of alcohol (90 per cent.) being added, and the whole macerated for a week, then pressed. To the marc 1½ pint of alcohol (45 per cent.) was added, and the mixture pressed again. The resultant tincture measured about 5½ pints. It had sp. gr. 0·956, and yielded 2·9 per cent. of extractive. The aroma and colour were incomparably superior to the official tincture, and it keeps much brighter and " cleaner " than the B.P. preparation.

Indian Hemp, Cause of the Loss of Activity of. C. R. Marshall. (*Pharm. J.* [4], **28,** 418.) The loss of activity is probably due to oxidation of cannabinol. A specimen of cannabinol kept in a sealed tube for over ten years in the light was still active when the tube was opened. The charas from which this had been originally obtained had meanwhile so far deteriorated that it now gave no active cannabinol. It is probable that preparations of Indian hemp quickly deteriorate; they should be kept in hermetically sealed vessels and resealed each time after opening.

Indoform a Mixture. G. Frerichs. (*Apoth. Zeit.*, **23,** 641.) Indoform (*Y.B.*, **1904,** 197) is not, as claimed, a methylene compound of acetosalicylic acid, but is merely a mixture of 1 part of salicylic acid and 2 parts of acetyl-salicylic acid, with a trace of formaldehyde and a minute trace of methyl salicylate. It may be reproduced, if desired, by damping a mixture of these two acids with formaldehyde solution, drying on the water-bath, powdering, and flavouring with a trace of methyl salicylate.

Iodeigone and Sodium iodeigone. G. Frerichs. (*Apoth. Zeit.*, **24,** 144.) It is claimed by the makers of iodeigone that the iodine is intimately combined in the form of protein compounds, and partly as hydriodides of amine compounds. It is stated not to contain alkali iodides nor HI, and to be insoluble in water. The author finds, however, that the statements are not correct. Iodeigone gives 49 per cent. of matter soluble in water, and the I is almost entirely soluble chiefly in the form of free HI; it also contains soluble iodides, and only 1 per cent. of I in insoluble combination. Sodium iodeigone does not contain more than a trace of I in organic combination; it is almost all the form of NaI. Moreover, these preparations contain a considerable quantity of NaF, as much as 4 per cent., doubtless added as a preservative for the egg albumin used.

Iodein. (*Med. Press*, **87,** 456.) This name has been coined for codeine di-iodide. It acts as a sedative and expectorant, and is of great value in bronchial affections and asthma. It increases the depth and regulates the rhythm of the breathing, thus relieving dyspnoea. Its activity, in the same dose as that of codeine, is not impaired by prolonged use, and it has no ill effects.

Iodine for Sterilizing the Skin. F. J. W. Porter. (*Brit. Med. Journ.*, **1, 1909,** 332.) A 10 per cent. alcoholic solution of iodine painted on the skin completely sterilizes the surface. The evening previous to an operation the patient has a hot bath, using plenty of soap, but not excessive scrubbing. The area is then shaved, washed, and bandaged with dry lint. Nothing more is done until the patient is on the table. If eucaine is being used, the area is freely painted with the solution of iodine, and the eucaine injected. Before making the incision, the area is painted once more. Preliminary scrubbing and wetting tend to close the intercellular spaces of the skin, and thus make it difficult for the solution of iodine to disinfect the surface to be operated upon; the skin should therefore be quite dry before the application of the iodine solution. The method is specially suitable for military and naval surgical work.

Iodine for Surgical Tuberculous Disease. W. A. Tatchell. (*B.M.J.*, **1, 1909,** 391.) The application of *Liquor iodi fort.* directly to the wound daily, after operation, is found to be superior to all other dressings for use subsequent to the removal of tuberculous tissue. It is also useful for the treatment of ulcers due to mixed infection. In the large phagedaenic ulcers widely met with in China and the East, the local application of iodine liniment gives brilliant results. Packing is not employed after the first application. The dressing is not painful, except momentarily, when applied to some surfaces.

Iodival. F. Zernik. (*Apoth. Zeit.*, **23,** 777.) This name has been given, for brevity, to a-mono-iodo-isovaleri-amylurea

$(CH_3)_2 : CH{\cdot}CHI{\cdot}CO{\cdot}NH{\cdot}CO{\cdot}NH_2$. It is one of the few synthetic preparations on the market which bears out the chemical constitution claimed for it. It is the iodine analogue of bromural, and is obtained by heating 10 of that compound for 14 hours on the water-bath with KI 20, and EtOH 20. After filtration, iodival crystallizes out from the filtrate. It is a white crystalline powder ; m.p. 180–181°C. ; insoluble in water, sparingly soluble in Et_2O dissolved by EtOH. It contains the theoretical amount of I, 47 : 100. It is stated to be a perfect substitute for the inorganic iodides which are slowly decomposed by the gastric secretion. The dose is 5 grains three times daily.

Iodoformogen (*Pharm. Zentralh.*, 1909, **50,** 167) is an odourless iodoform-albumin compound, specially suitable for use as a general antiseptic in dental work, for filling root canals, and for the treatment of dental caries.

Ipecacuanha Cultivation. E. M. Holmes. (*Pharm. J.* [4], **28,** 765.) Attempts to cultivate ipecacuanha in the East Indies have sometimes failed to produce satisfactory second crops. This may be due to a deficiency of lime and magnesia in the soil. Analysis of the ash of ipecacuanha shows that it contains a large amount of MgO and CaO and of P_2O_5. This suggests the advisability of manuring with these constituents in the form of phosphates.

Iron, Action of, on the Teeth. — Morgenstern. (*Chem. & Drugg.*, 73, 34.) FeI_2 and $FeCl_2$ have the most injurious effects on the teeth, 10 per cent. solutions removing the enamel in a few days. Iron sulphate, lactate, and pyro-phosphate cause partial decalcification and very deep blackening, while the citrate has only a slight action. Solution of iron albuminate and the saccharated solution have no effect. In mineral ferruginous waters the action of the iron seems to be increased by the presence of earthy salts. The action of these preparations taken medicinally is, of course, much slower than was the case in these experiments, which were made by immersing sections of tooth in solutions, but it is always advisable to recommend the use of the glass tube for taking iron preparations, or a mouth wash should be used immediately after the medicine is taken.

Javan Medicinal Plants. Buysman. (*Apoth. Zeit.*, **1909,** 5.) *Acacia tenerrima* bark contains an alkaloid which is a heart poison. The leaves of *A. tomentosa* are used for cleaning the hair. The roots and leaves of *Acolypha densiflora* are given for fetid breath and haemoptysis; the leaves of *A. hispida* are diuretic and sudorific; and those of *A. indica* are given, in powder, as a vermifuge for children. The leaves and roots of *Achyranthes aspera* are stomachic, digestive and diuretic; the leaves are used for scorpion stings, the seeds for hydrophobia and snake bite, and the ash as an application against itching. The root of *Adhatoda betonica* is given for phthisis and for snake bite.

Kawar Root. A. Bochm and R. Kubler. (*Archiv. Pharm.*, **246,** 663.) The botanical source of the drug is undetermined; it probably belongs to the N.O. Asclepiadaceae. It is employed by the natives of the Transvaal as a cancer remedy. The chief constituent is a soluble glucoside, kawarin, resembling condurangin. A considerable amount of essential oil resembling condurango oil is also present.

Lavender Plants, Classification of. C. Chatenier. (*Schimmels' Report, November*, **1908,** 76.) The plants yielding French lavender oil are: *Lavandula latifolia*, Vill.; *L. spica*, var. β L., great or male lavender; *Lavandula officinalis*, Chaix; *L. vera* D.C.; *L. spica*, var. *a* L., true or female lavender. Jordan splits the latter into two varieties: *L. fragrans*, sweet or medium lavender; this yields a fairly good oil, and is found at the lower altitudes; and *L. delphinensis* Jord., dwarf or fine lavender . . . it is found exclusively in the higher regions; its oil is the best. Then there is the cross of *L. latifolia* × *L. fragrans*, called *L. hybrida*; known as bastard or great lavender, lavandin, and spigoure. Its oil is of inferior quality. It should not be confused with the other great lavender or spike.

Mace, Commercial. E. M. Holmes. (*Pharm. J.* [4], **27,** 652.) A descriptive article of the various kinds of commercial mace, with illustrations of the structure of the Banda and Bombay varieties. Tests for the purity of the spice are given.

Medinal. (*Bull. Sci. pharm.*, **16,** 168.) This name is given to sodium diethylbarbiturate, or sodium veronal. It has the advantage over veronal of being soluble 1 : 4 in water; it therefore acts more quickly. The dose is from 5 to 15 grains.

Meligrin (*Apoth. Zeit.*, **1908, 23,** 763) is obtained by condensing dimethyloxyquinine with methylphenylacetamide. It forms a white, micro-crystalline, bitter, somewhat acrid powder, very soluble in water 2 : 1 ; m.p. 105°C.

Mercury Oleobrassidate for Syphilis and Phthyriasis. R. Dupuy. (*Nouveaux Remèdes*, **26,** 121.) Brassidic acid is the isomeric form of erucic acid of rape oil. By combination with mercuric oxide and oleic acid, mercuric oleobrassidate is obtained as a bright yellow gelatinous body containing 30 per cent. of Hg. It is quickly absorbed by the skin, leaves no greasy feeling, is quite soluble in soap and water, and does not stain the linen. It is also remarkably well tolerated. For syphilis, it is given by inunction every or every other day, in doses of 170 grains, repeated if requisite up to 30 times ; 10 or 15 applications are usually sufficient. Syphilitic sores are dressed with an ointment. Phthyriasis of various parts, and also itch, readily yield to the application of the oleobrassidate. It is more efficacious generally, and better tolerated, than mercurial ointment or grey oil.

Mergandol, a Defective "Synthetic" Preparation. F. Zernik. (*Apoth. Zeit.*, **24,** 99.) "Mergandol" is a preparation which has been introduced for the intramuscular administration of mercury by injection. It is claimed to be a solution of sodium mercury glycerate in glycerin, containing 0·0035 Gm. of mercury in each c.c. Injections with it are said to be painless.

It is found to be simply a solution of $HgCl_2$, 0·5, and NaCl, 0·1, in 100 parts by weight of hydrated glycerin. The solution has the specific gravity 1·2177 ; 1 c.c. of it contains 0·0044 Gm. of Hg, or 0·9 Mgm. more than claimed for it ; but 1 Gm. contains 3·6 Mgm., practically the quantity stated to be in 1.c.c. Not only is the preparation, therefore, incorrectly described, but its dosage is erroneous.

Neuralteine. G. Amore. (*Gazz. osped.* ; *Nouveaux Remèdes*, **26,** 177.) Sodium para-ethoxyphenylaminomethanosulphonate has been introduced into medicine under the above name. It is stated to be prompt in action, non-toxic in medicinal doses, and free from any deleterious action when used as an analgesic in various nervous disorders.

New Remedies. F. Zernik. (*Berichte Pharm.*, **1909,** 89 ; *J. Pharm. Chim.* [6], **29,** 489.) *Autoform* is an antiseptic obtained by the reaction of formaldehyde on $KMnO_4$, the formaldehyde being in a solid form with a soap basis. A similar preparation may be obtained by saturating porous blocks of cement with $KMnO_4$ solution, and pouring formalin thereon.

Medinal is another name for the sodium salt of veronal. It is more soluble in water than veronal.

Valisane; *Eubornyl*. These two products are practically identical, and are bornyl α-bromo-isovalerianate. They, therefore, resemble bornyval.

Diaspirine is succinyl-salicylic acid. It is introduced as a substitute for aspirine, and is administered in the same doses.

Digipuratum is a physiologically standardized preparation of digitalis; it is claimed to contain the active principles of the plant in a natural state, but free from digitonin.

Cardiotonin is a compound of sodium benzoate, caffeine and the active principles of *Convallaria* flowers. It is claimed to contain convallamarine but no convallarine.

Eulaxane is sodium phenolphthalein, obtained by combining one molecule of phenolphthalein with two molecules of NaOH.

Abanone is magnesium phosphotartate. It is a white powder, a teaspoonful of which acts as a gentle aperient.

Tanargane is the precipitate obtained by treating egg albumin solution with solution of tannin and of $AgNO_3$. It is a brownish-black powder, containing 11 : 100 of Ag, and is used as an intestinal disinfectant.

Kharsine is an atoxyl substitute. It resembles the latter, but is a compound of meta-toluidine instead of aniline.

Orsudane is the acetyl derivative of kharsine.

Allosan is santalyl allophanate $NH_2\,CO{\cdot}NH{\cdot}CO{\cdot}OC_{15}H_{23}$, which is the only yet known crystalline derivative of santalol. It forms a white, aromatic powder, m.p. 162°C. It is given in doses of 15 grains three times daily.

Nitrates and Hydrocyanic Acid, Loss of, in Drugs, during Drying. E. Couperot. (*J. Pharm. Chim.* [6], **29,** 100.) A series of experiments shows that plants lose a very considerable portion of nitrates and of cyanogenetic glucosides during the process of drying. Since these constituents play an important part in the therapeutic action of certain plants, the effect of drying may often be to notably lessen the medicinal value of some drugs.

Novaspirin-quinine. L. Santi. (*Boll. Chim. farm.*, **1908,** 219; *J. Pharm. Chim.* [6], **28,** 219.) By pouring a dilute Et_2O solution of quinine into a slight excess of novaspirine dissolved in the same solvent, the salt $C_{20}H_{24}N_2O_2 \cdot C_{21}H_{16}O_{11}$ is obtained as a flocculent precipitate, which when washed with Et_2O and dried in the air, forms a micro-crystalline powder ; m.p. about 95°C. with decomposition. Under similar conditions with the quinine in slight excess the salt $(C_{20}H_{24}N_2O_2)_2 \cdot C_{21}H_{16}O_{11}$ is obtained, which has the same m.p. as the above salt. In whatever proportion the two ingredients are mixed, one or other of the above compounds results ; although theoretically, since novaspirine is a dibasic acid, the compound, $C_{20}H_{24}N_2O_2 \cdot (C_{21}H_{16}O_{11})_2$ could exist ; it has, however, not yet been obtained.

Nutmegs of Commerce. E. M. Holmes. (*Pharm. J.* [4], **28,** 419, 459.) The chief kinds of genuine and spurious nutmegs are described in detail and figured.

Nutmegs, Toxic Principle of. H. H. Dale, F. B. Power and A. H. Salway (*Amer. J. Pharm.*, **80,** 12.) Physiological experiments on cats show that the narcotic property of nutmegs is due to myristicin. Since, however, pure myristicin is a markedly less active poison than doses of nutmeg containing relatively less of that body, it is assumed that, in the nutmeg, myristicin is associated with other constituents, which render its absorption more easy. Lower animals appear to be much less sensitive than man to the narcotic poison of nutmeg, which acts on the cerebral functions. Besides myristicin, a viscid body, with the formula $C_{18}H_{22}O_5$, separated from the unsaponifiable constituents of expressed oil of nutmeg, the resins of the press cake, and the aqueous liquid from the alcoholic extract of the press cake, were all submitted to physiological tests, but were found to be devoid of toxic action. No alkaloid nor toxic soluble proteid was found in nutmegs. Ipuranol, $C_{23}H_{38}O_2$, was isolated from the ether extract of the resin.

Nutmegs, Wild, from Madagascar. E. Heckel. (*Repertoire.*, **21,** 49.) Of the two species described and figured, one is identified as being the fruit of *Brochoneura vouri* Warb. (*Myristica vouri* Baill.), and the other, a new species of the same genus, is named *B. dardaini*. The seeds of both are very fragrant, and contain, in the endosperm, a large amount of fat.

Nux Vomica Powder, French, Adulterated with Powdered Olive Stones. A. Juillet. (*Répert. Pharm.* [3], **21,** 148.) and — Planchon (*ibid.* 241.) Eighty per cent. of the samples of the commercial French powdered nux vomica examined have been found to be adulterated with ground olive stones. Some of these samples had been in stock seven or eight years, others were of more recent grinding. Woodcuts illustrating the distinctive microscopic characters of genuine and adulterated nux vomica powders are given. Rasped nux vomica, as met with in French pharmacy, is also adulterated with the raspings of vegetable ivory, the seed of *Phytelephas macrocarpa*.

Odylis, Terpin Resorcinate. D. Monteil. (*L'Union Pharm.*, **50**, 159.) Resorcinol, 110 Gm., is heated to 100°C. on the water-bath with terpin, one mol. (190 Gm.) until the mixture forms a thick yellow fragrant oil. This product, named odylis, is a powerful disinfectant. It is suggested for internal use, in gelatin capsules, as a vesical disinfectant, as well as for external use. It is soluble in oils and fats, and in alcohol.

"Oleum Pini sylvestris," derived from Abies pectinata Cones. (*Schimmels' Report, April*, **1909**, 79.) Attention is again directed to the fact that the so-called *Oleum Pini sylvestris* of commerce is not distilled from pine needles, but is the oil of the cones of *Abies pectinata*, known also as "templin oil." True oil of pine needles is stated to be unobtainable, although it is official in the Supplement to the *Ph. G. IV* and in the *Ph. Russ.* (See also *Y.B.*, **1908**, 159, 254.

Opium for Stage or Speech Fright. (*B.M.J.*, **1**, **1909**, 1456.) Small doses of opium, such as 6 to 10 minims of the wine, or 10 to 30 minims of the tincture, as prescribed by Sir Morell Mackenzie, or even $\frac{1}{4}$ to $\frac{1}{2}$ grain of opium itself, as recommended by Luther Holden to nervous students entering for examination, are undoubtedly valuable in quieting the nervous excitement which causes speech and stage fright. The drug, however, should only be used under medical direction. Bromides are found to be useless for this purpose.

Ostauxin and Para-bismuth. F. Zernik. (*Apoth. Zeit.*, **24**, 88.) *Ostauxin* is stated to be calcium paranucleinate, obtained by digesting casein with pepsin in presence of HCl and neutralizing the acid product with $CaCO_3$. The filtrate is evaporated *in vacuo*, rendered alkaline with $Ca(OH)_2$, filtered, and the calcium paranucleinate precipitated with EtOH. Ostauxine, thus obtained, is a white, faintly saline powder, soluble in water; precipitated from aqueous solution by heat. Zernik finds that it is markedly different from its claimed composition, since it contains 5·88 per cent. of Ca instead of 1·7 per cent., and only 1·75 per cent. of P instead of 2·5 per cent.

Para-bismuth is obtained by the double decomposition of ostauxin in NaCl solution, with $Bi2NO_3$. It is an odourless and tasteless insoluble yellow powder containing 44·2 per cent. of Bi, instead of 50 per cent. as claimed.

Oxalic Acid, Bactericidal Properties of. G. Mayer. (*Apoth. Zeit.*, **24**, 251.) A 0·5 per cent. solution of oxalic acid is found to equal a 5 per cent. aqueous solution of phenol as a bactericide and disinfectant. This antiseptic property of oxalic acid is not generally recognized, and is probably capable of wider application. For some time, a solid disinfectant, *phenostal*, has been prepared, consisting of diphenyl oxalate. On contact with water this is resolved into phenol and oxalic acid. Its 1 per cent. solution is equal as a disinfectant to a 5 per cent. solution of phenol. It owes its activity to the oxalic acid, which alone is twice as active as phenostal and ten times more active than phenol.

Para-iodophenylarsonic Acid and Asyphil. E. Mameli, A. Patta and S. Ciuffo. (*Seventh Internat. Congress of Applied Chem.; Pharm. J.* [4], **28**, 867.) The acid and some of its derivatives are described. It is more toxic than atoxyl. Asyphil para-anilidosonate of mercury, $Hg2H_2N{\cdot}C_6H_4{\cdot}AsO{\cdot}OH{\cdot}O$ is introduced as a remedy for syphilis.

Phenolphthalein, Sodophthalyl and Disodoquinone phthaleinate as Purgatives. C. Fleig. (*Archiv. Internat. Pharmacol.; Nouveaux Remèdes*, **26**, 241.) Phenolphthalein and its sodium compound, the latter introduced into medicine under the above names, afford valuable and perfectly harmless purgatives of special value in treating constipation in cases with derangements of the heart or kidneys. They are devoid of toxic action, cause no irritation, and act by stimulating the biliary and intestinal secretions. The action is likened to an intestinal diuresis. This elimination of a large amount of fluid by the intestines relieves the kidneys, and is specially useful in uraemia and similar toxic diseases. Phenolphthalein may be safely administered during pregnancy. The normal adult dose is 2½ to 7 grains, best administered in tablet form. The sodium compound, being more active, is given in smaller dose.

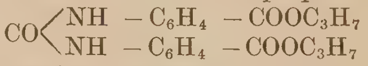
Phytostal (*J. Pharm. Chim.* [6], **29,** 490) is the name given to a solution of eserine in arachis oil, for ophthalmic use.

Poppy Seed Oil, Varieties of. L. Vuaflart. (*Annales des Falsifications*, **2,** 276.) The definition given to poppy seed oil at the International Food Congress at Geneva, " the oil extracted from the seeds of the black poppy," is scarcely correct. Two varieties of poppy seed oil occur in European commerce, known respectively as " huile d'oeillette " and " huile de pavot." The former is bright yellow, has a pleasant nutty taste, and froths when shaken, the froth being persistent. It has a higher commercial value than " huile de pavot," and is pressed exclusively from grey or black poppy seeds of European growth. " Huile de pavot " is derived from yellowish white or bluish black exotic poppy seeds ; its flavour is less agreeable and somewhat harsh, and it is less unctuous on the palate, although the viscosity of the two oils, determined in the usual manner, shows no marked difference. It is also markedly lighter in colour than " huile d'oeillette," does not froth when shaken, and is less suited for dietetic use. Its commercial value is therefore lower. The sp. gr. of " huile d'oeillette " is 0·924 to 0·926 ; that of " huile de pavot " 0·923 at 15°C. The other " constants " of the two oils are practically identical. The chief points which distinguish the oils are colour, taste, and frothing power.

Potassium Iodide for Local Treatment of Incipient Cataract. Defour. (*Med. Press.*, **86,** 587.) (1) Potassium iodide, 5 grains ; distilled water, 150 minims. One or two drops to be instilled into the eye morning and evening. (2) Potassium iodide, 2 drachms ; distilled water, 10 fluid ounces. Bathe the eye twice daily for one to two minutes, by means of an eye bath. (3) Potassium iodide, 5 grains ; soft paraffin, 150 grains. Introduce a piece the size of a pea into the conjunctival sac morning and evening. The results are stated to be most successful in the early stages of cataract.

Potent Drugs, International Agreement with Regard to Standardization of. P. W. Squire and C. M. Caines. (*Internat. Congress Applied Chem. ; Chem. and Drugg.*, **74,** 877.) The points of agreement and difference in the various pharmacopœias is illustrated and discussed ; the chief drugs dealt with being preparations of iodine, lobelia, nux vomica, opium, cocaine, colchicum, strophanthus, arsenical compounds, cantharides, ergot, mercurial ointments, ipecacuanha, and hyoscyamus. Special recommendations are made in certain instances, as tending to lead to greater uniformity.

Propaisine and Dipropaisine. (*Apoth. Zeit.*, **23,** 786.) *Propaisine* is the name given to propyl para-amidobenzoate $C_6H_4\left\langle\begin{array}{l}NH_2\\COOC_3H_7\end{array}\right.$ It forms colourless, slightly alkaline crystals, m.p. 73–74°C.; sparingly soluble in water, readily dissolved in organic solvents. Soluble in oils 7 : 100. When saponified with NaOH it gives the characteristic odour of propyl alcohol, and on adding a mineral acid, para-amidobenzoic acid is precipitated. On adding a few drops of solution of KNO_2 to 0·2 Gm. of propaisine dissolved in 10 c.c. of water and a little HCl, then an alkaline solution of β-naphthol, a deep red persistent precipitate is obtained. Propaisine is a slightly antiseptic, non-toxic, non-irritant, local anaesthetic, specially suitable for application to open wounds, for skin lesions, and for internal administration.

Dipropaisine consists of 2 mols. of propaisine linked by a CO group, thus,  $CO\left\langle\begin{array}{l}NH - C_6H_4 - COOC_3H_7\\NH - C_6H_4 - COOC_3H_7\end{array}\right.$. It is a light white, odourless, tasteless powder, m.p. 171–172°C., insoluble in water, soluble in alcohol. Although itself devoid of anaesthetic action, it is decomposed in alkaline physiological solution into propaisin. This action takes place even in the alkaline saliva. It is quite harmless in doses of 7½ to 30 grains, and is specially serviceable as an intestinal analgesic for cramp or colic. At the same time it has a distinct hypnotic action in doses of 15 grains and is free from any secondary ill effects. It is prescribed in powder or in tablets, mixed with an equal quantity of sugar. From its indifferent chemical constituton it is compatible with most drugs, except alkalies, and may be prescribed in conjunction with intestinal disinfectants.

Prunus serotina Bark, Spurious. H. Finnemore. (*Pharm. J.* [4], **28,** 191; and E. M. Holmes, *ibid.*, 192.) Finnemore describes another spurious cherry bark which developed no aromatic odour on maceration with water, and which contains a considerable amount of astringent matter. Holmes describes and illustrates the microscopical structure of true *Prunus serotina* bark, also of the barks of the spurious cherry discovered by Finnemore in 1904 (*Y.B.*, **1904**, 252) and now, and of the bark of *P. emarginata*. (See also p. 71 *ante*.)

Pyroiodone. H. Cousin. (*J. Pharm. Chim.* [6], **28,** 158.) An Italian speciality introduced under this name proves to be merely a mixture of a solution of pyramidone hydriodide and free pyramidone in distilled water. A practically identical preparation may be obtained by dissolving pyramidone 23·03 Gm. in solution of HI 69 per cent. 12·5 c.c. and distilled water sufficient to make 100 Gm. The preparation should be protected from light and air, otherwise a brown insoluble precipitate will be formed.

Quinine and Cinchonine para-aminophenyl arsinate. (*Apoth. Zeit.*, **23,** 850.) The atoxyl salts of quinine and cinchonine, which should have considerable therapeutic value, have been prepared. An aqueous solution of 3 parts of quinine hydrochloride is mixed with a similar solution of 3·1 parts of sodium atoxyl ; quinine atoxyl separates in a short time in white needles, m.p. 202°C. Soluble 1 : 635 of water, 1 : 133 of glycerin, and 1 : 534 of physiological salt solution. These solutions may be sterilized at 100°C., and are very stable. The cinchonine salt, similarly prepared, melts at about 180°C.

Resorcinoform. D. Monteil. (*L'Union pharm.*, **50,** 157.) Resorcinol 110 is dissolved in formaldehyde solution 100. The solution is then poured into an excess of HCl. The mixture becomes hot and forms a red magma, which is kept stirred to prevent it adhering to the vessel. The liquid is then filtered off and the precipitate dried at 25°C., and powdered. This product, resorcinoform, is a powerful odourless and tasteless disinfectant.

Rhus toxicodendron and Ampelopsis. E. M. Holmes. (*Pharm. J.* [4], **27,** 231.) Allusion having been made in the lay press to the distressing symptoms occasioned by the irritating effects of contact with the leaves of the plant, sometimes cultivated in this country and confused with *Ampelopsis vietchii* and *A. hoggii*, considerable uneasiness was aroused in the public mind. The differences between the plants are described, and photographs of the leaves reproduced.

Rumex obtusifolius, Organic Iron Compound in. P. J. Tarbouriech and P. Saget. (*Bull. Sci. Pharm.*, **16,** 259.)

Rumex obtusifolius is richer in iron than any plant hitherto examined, the root containing no less than 0·447 per cent. The metal is not present, however, in a condition which affords reactions with the ordinary tests, but is masked as an organic compound. This is only sparingly soluble in alkalies, aqueous acids, and EtOH. It is, however, more readily dissolved by strong EtOH containing a little HCl. The powdered root is first macerated for several days with EtOH 95 per cent., and when exhausted, the marc is dried. It is then extracted in the cold with 1 per cent. aqueous HCl, which removes CaC_2O_4 and earthy salts. The residual material is then further macerated with EtOH 95 per cent. containing 1 per cent. of HCl, as long as the acid menstruum is coloured brown. The bulked liquid is then exactly neutralized with AmOH, when a copious precipitate is formed. This is collected, washed with water, dried, and extracted with Et_2O to remove chlorophyll. The product is then dried, when it forms a black brilliant mass burning with incandescence and leaving an ochre-coloured ash, rich in Fe and containing as well Ca and P_2O_5. It has not been obtained crystalline, and is insoluble in organic solvents; EtOH with 1 per cent. HCl is its best solvent. Dilute acids and alkalies dissolve it very slowly. Its centesimal composition is: C, 43·27; H, 6·44; N, 4·08; P, 1·72; Fe, 6·36; ash, 9·91; oxygen by difference, 36·3. It is only partially hydrolized by 1 per cent. HCl, but with 10 per cent. it is entirely decomposed, giving hydrolysis products which abundantly reduce Fehling's reagent. It appears, therefore, to be allied to the nucleones. The presence of this body in quantity in the drug explains the remarkable therapeutic results which have been obtained from the administration of the powdered root as a chalybeate tonic.

Sabromin. (*Apoth. Zeit.*, **23,** 652.) Calcium dibromobehenate, a white odourless and tasteless powder, is thus introduced as a non-toxic bromo-compound. It is given as a substitute for alkali bromides in doses of 30 to 60 or even 90 grains per diem. It is the analogue of saiodin (*Y.B.*, **1908,** 138).

Salol in Dentifrices, Harmfulness of. — Carle and — Pont. (*Lyon médical; Nouveaux Remèdes*, **26,** 288.) Antiseptics generally are condemned for use in mouth washes and tooth-powders, since most of them exercise an irritant action on the buccal mucous membrane, especially after prolonged use. Salol is specially harmful in this respect, and is most prone to give rise to eczematous affections. Antiseptics are not necessary in dentifrices; all that is needful is an inert alkaline substance to neutralize the buccal acidity and to mechanically clean the dental interstices.

Scammony, Factitious, Prepared with Scammony Resin. J. Warin. (*J. Pharm. Chim.* [6], **29**, 521.) A factitious scammony is met with in Continental commerce, which is prepared by mixing the resin extracted by solvents from scammony roots with some inert matter. This is easily distinguished from genuine natural scammony by the greater elasticity and softening when rolled between the fingers and breathed on. Its powder is much lighter in colour and has not the blackish shade characteristic of true scammony. The spurious drug does not emulsify well with water; its alcoholic solution gives a red colour with H_2SO_4; genuine scammony does not give this; and it has a fruity odour quite different from the peculiar sour smell of true scammony.

Senega Root, A New Spurious. C. Hartwich. (*Schweiz. Woch. Chem. Pharm.*, **46**, 749.) A consignment of senega root has been found to contain an admixture of 15 per cent. of an adulterant of undetermined botanical origin. These roots somewhat resemble true senega in appearance, and some of the rootlets are keeled, but the histological characters and structure (of which a diagram is given) are quite distinct from both true *Polygala senega* and any of its substitutes hitherto described.

"Synthetic" Preparations, Inferior. F. Frerichs. (*Apoth. Zeit.*, **23**, 917.) "*Argentum Proteinicum*," of Swiss origin, a substitute for protargol, was found to contain but 4·56 per cent. of Ag, 23·16 per cent. of matter insoluble in water, and 13 per cent. of ash. About 25 per cent. of the last was soluble in water, and was probably NaCl. It contains about half as much Ag as protargol. "*Thymolum iodatum*," from the same source, gave 30 per cent. of iodine and no less than 27 per cent. of ash, consisting of ferric oxide, alumina, and silica. Pure dithymol di-iodide should give approximately 46 per cent. of iodine and no appreciable ash. E. Waldmann has previously reported on a sample of Swiss "aristol," which contained only 15 per cent. of that compound, being adulterated with red-tinted pipeclay.

Spurious and Adulterated Drugs imported into New York during 1907–8. H. H. Rusby. (*Proc. Amer. Pharm. Assoc.*, **56,** 783.) Among the spurious and adulterated drugs officially noted at the Port of New York, the following may be of interest :—

Cut Dandelion root yielding 48 per cent. of ash, including 40 per cent. of stones ingeniously coloured to resemble the root. *Belladonna root* partially or wholly substituted by poke root, and powdered belladonna adulterated with 50 per cent. of powdered olive stones. Improperly cleaned *henbane* leaves containing 28 per cent. of sand ; *anise* fruits (*Pimpinella*) from 20 to 25 per cent. ; *cummin* fruit having 25 per cent. of pedicels and chaff. *Lactucarium* permeated throughout by moulds. *Jambul* fruits entirely eaten out by "worms." *Belladonna* leaves containing 50 to 80 per cent. of petioles and stems. Of the *matico* sent to New York, five shipments were spurious and four genuine. Several shipments of *Aspergula* seeds have been sent as *asparagus* seeds, possibly by a confusion of names ; and *Nigella* seeds sent for caraways, because, perhaps, they are sometimes called "black caraways." Japanese *Scopola* has been substituted for the European variety. Five shipments of spurious *coto* bark have been noted. *Soap bark* (*quillaia*) differing from the authentic drug have been exported from unknown ports, and are derived from unknown botanical sources. The admixture of *stramonium* with *henbane*, and *vice versa*, has occurred. Several species of *Marrubium* have been sent as "horehound." *Japanese aconite* has been offered as aconite (*A. napellus*) ; *mylabris* has been named cantharis. Worthless brown *strophanthus* seeds continue to be offered as the official drug, and this occurs with *jaborandi*. A large woody rhizone, probably that of a *Inula* or *Doronicum*, has been imported as *arnica*. Nearly all the *belladonna root* received has been adulterated with poke root, to the extent of 15 to 42 per cent. Many of these have also contained *scopola* root. Small worthless *nux vomica* seeds have been met with rolled in a mixture of clay, probably with the pulp of nux vomica fruit, so as to give them the size and weight of good seeds. *Powdered gentian* was much adulterated : samples have been received containing 50 per cent. of fibre ; another containing ground olive stones. *Turmeric* powder mixed with wheat starch ; *ipecacuanha* powder with 50 per cent. of olive stones ; and many other powdered drugs were adulterated with starch, olive stones and similar fraudulent admixtures.

Thallium Poisoning. D. Olmer and A. Tain. (*L'Union pharm.*, **50,** 53.) Although thallium acetate has long been known to act as an anhydrotic, and has been recommended (*Y.B.*, **1898,** 206) to diminish the night sweats of phthisis, it was then stated to require careful administration, since it causes a remarkable alopecia. In the case under notice, thallium acetate solution had been applied to the chest as a depilatory. Its use was followed by distressing toxic symptoms; severe pains in the extremities, sudden and diffuse alopecia, involving even the eyelashes and eyebrows, persistent albuminuria, stomatitis, and general depression. This continued for a month, when convalescence commenced. Twenty-five days after the application, the cephalo-rachidian fluid gave the spectrum of thallium.

Thiozonide in Medicine. H. Erdmann. (*Nouveaux Remèdes*, **26,** 153; *Annalen*, **372,** 134.) Like oxygen, sulphur forms a molecule S_3, analogous to ozone, which has been named thiozone, and which forms thiozonides, analogous to the ozonides. When linalyl acetate is heated with half its weight of S at 160°C. in an oil bath for 8 hours, the viscous brown thiozonide $C_{12}H_{20}O_2S$ is formed, acting as an acid with alkali sulphides, and forming with Na_2S, the thiozonidate $Na_2S_4C_{12}H_{20}O_2$, soluble in C_2H_5OH. When this alcoholic solution is poured into water decomposition occurs, and thiozonide, which is liberated, is emulsified in the resulting solution of sodium sulphide. This emulsion is recommended for use in dermatology.

Thyresol, Santalyl Methylic Ether. (*J. Pharm. Chim.* [6], **29,** 116.) Thyresol, $C_{15}H_{23}{\cdot}O{\cdot}CH_3$, varies in sp. gr. between 0·930 and 0·940; it has an odour of cedar, and an aromatic taste. Insoluble in water, it readily dissolves in alcohol, oils, and other organic solvents. It is claimed that when taken internally it does not derange the stomach nor the kidneys. It is put up in the form of capsules, or as tablets with magnesium carbonate, each tablet containing 4 grains of thyresol.

Tragacanth, Spurious. W. L. Scoville. (*Drugg. Circ.*, **53,** 116.) The two Indian gums, from *Sterculia urens* and from *Cochlospermum gossypium*, are the most common substitutes for genuine tragacanth. Although easily distinguishable when whole and unmixed, the detection of powdered Indian gum in powdered tragacanth is not so simple. The following modification of the borax test will, however, detect the admixture of 5 per cent. of the former. Two Gm. of gum is shaken with 100 c.c. of cold water until thoroughly swollen and free from lumps. (If the gum is in powder form, solution is hastened by first wetting it thoroughly with 3 c.c. of alcohol, then pouring on the water quickly). Two Gm. of powdered borax is then added and the mixture shaken until the borax is dissolved. The mixture is now allowed to stand over night. The tragacanth mucilage will then show no change in consistence or appearance beyond a slight darkening in colour. The Indian gum mucilage will have lost its transparency and become slimy. On pouring, it strings out very markedly. If two or three drops be manipulated between the thumb and forefinger, strings several inches long will be easily obtained. A mixture of 5 per cent. of Indian gum with 95 per cent. of tragacanth will form a string one-quarter to one-half inch in length when tested in this way, in 2 per cent. solution.

Tragacanth mucilage shows none of this stringy or tacky tendency until after it has stood in borax solution for several days. Even on prolonged standing this sliminess is much less marked. For the detection of Indian gum, which may be present in small proportions only, the test should be made within 36 hours after adding the borax.

Tuberculins. F. W. Gamble. (*Pharm. J.* [4], **28,** 146.) A useful descriptive article on the various tuberculins prescribed for the treatment of tuberculosis.

Valisan, a New Sedative (*Apoth. Zeit.*, **23,** 786), is stated to be a compound of bromine with bornyval, containing 25·2 per cent. of bromine, 48·3 per cent. of borneol, and 26·5 per cent. of isovalerianic acid. It is supplied in gelatin capsules and is introduced as a nervine sedative. It is said to be much more pleasant to take than bornyval or other preparations containing valerianic acid. Its taste is not powerful, and is pleasantly aromatic. It may be prescribed in large doses without danger.

Vanilla Eczema. — Claverie. (*J. Pharm. Chim. Append.* [6], **28**; [7], **27,**) Those who handle vanilla "pods" are sometimes affected by a more or less intense cutaneous eruption, chiefly on the hands and face. In severe cases this may be accompanied by considerable constitutional disturbances. The cause has been attributed to the presence of acari on the vanilla, or to moulds, or to some added preservative. The author attributes the irritating action to the oil which exudes from vanillin. As a precaution, the hands should be thoroughly washed after handling vanilla and the apartment in which quantities are dealt with should be well ventilated. [Vanillin crystals when powdered have a markedly irritating effect on the nasal mucous membrane of some individuals. The action of coumarin is even more intense. Serious inflammation of the nasal passages, with a painful eruption on the nostrils and upper lip,have been known to occur with those who had frequently to powder coumarin crystals.—Ed. *Y.B.*]

Variation in the Activity of certain Toxic Drugs, Suggested International Inquiry on. P. MacEwan and G. P. Forrester. (*Internat. Congress Applied Chem.: Chem. and Drugg.*, **74**, 877.) It is suggested that inquiry should be made into (1) the climatic, soil, and other conditions of the localities where the drugs are grown and harvested for commercial purposes.

(2) Periodical chemical analysis of the parts of the plants used medicinally to be made with the view to ascertaining if they are harvested at the proper time.

(3) Agreement to be arrived at upon chemical or other methods which should be employed to judge the medicinal value of the drugs.

PHARMACY

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PART III

PHARMACY

Acetic Fluid Extracts. J. Feil. (*Proc. Amer. Pharm. Assoc.*, **56,** 883.) Certain acetic acid fluid extracts kept for 10 years compare favourably with alcohol preparations, especially those of squill and lobelia. Sanguinaria shows some precipitate, but the efficacy of the acetic extract is not apparently affected. Acetic fluid extracts are specially suitable for veterinary use, where alcohol is generally strongly contra-indicated. (See also *Y.B.*, **1893,** 190 ; **1897,** 214 ; **1901,** 177 ; **1904,** 274 ; **1905,** 226.)

Adrenine, Specific Reaction of. — Comessati. (*Pharm. Zeit.*, **53,** 786.) On adding a few drops of solution of $HgCl_2$ 1 : 1000 to 3 or 4 drops of adrenine solution 1 : 1000, diluted with 6 to 8 c.c. of distilled water, and shaking up strongly, a diffused red colour appears in 2 to 3 minutes which is persistent. Solutions of adrenine alone, in water, remain colourless for a varying period, from 30 minutes to 2 hours ; they then slowly acquire a red tint similar to that given with $HgCl_2$, but less intense. (See also *Y.B.*, **1908,** 6, 261.)

Allophanic Acid as a Means of Administering Nauseous Liquids in a Solid Form. M. Overlach. (*Apoth. Zeit.*, **23,** 549.) Although allophanic acid is obtained by the passage of HCN into alcohol, it is quite harmless, and is so readily decomposed into urea and carbonic acid that it is not known in the free state. It has the remarkable property of combining with many liquids, forming solid compounds. With santalol, ricinoleic acid, guaiacol and creosote, it produces tasteless and practically odourless white solids which may be administered in the form of powders. These compounds are split up in the stomach into their constituents.

Amerer's Infants' Species. (*Pharm. Zeit.* **53,** 808.) Harthorn shavings, 4 ; ivory shavings, 1 ; liquorice root, 1 ; locust beans, 2 ; figs, aniseed, fennel seed, of each, 1 ; lime-tree flowers, 8. Mix.

Anti-smoking Gum. B. Harman. (*Chem. andDrugg.*, **74,** 373.) Chewing gum incorporated with 5 per cent. of powdered quassia is prescribed as a substitute for the pipe for heavy smokers to whom tobacco had been interdicted on account of amblyopia. Some excessive smokers, especially where alcoholism is also present, require a stronger mixture of 1 : 12. (For formulae for chewing gums, see *Y.B.*, **1897,** 262.)

Anusol Suppositories, Fictitious. F. Suyver. (*Apoth. Zeit.*, **23,** 863.) Anusol is claimed to be iodoresorcinate of bismuth ; and its suppositories as put on the market are stated to contain 7·5 Gm. of that compound in 12 suppositories (*Y.B.*, **1898,** 252). The author finds, however, that they contain none. Neither iodine nor any sulphonic body was present in those examined. They contained a little resorcinol, with some Zn and Bi in the ash. (See also *Y.B.*, **1897**, 249 ; **1908,** 282, 317.)

Aronheim's Compound Diachylon Ointment. — Mrosak. (*Pharm. Zentralh.*, **50,** 161.) Silver nitrate, 3 ; Peruvian balsam, 50 ; adrenine solution 1 : 1000, 20, diachylon ointment to make 500.

Arsacetine and Mercuric Iodide Injection. — Labat. (*Bull. Soc. Pharm. Bord.* ; *Répert.* [3], **21,** 164.) Mercuric iodide 5 *centigrammes,* neutral sodium iodide 5 Cgm., are dissolved in a small tube graduated to 10 c.c., by warming with 2 c.c. of distilled water. Arsacetine 1 Gm. is dissolved by the aid of heat in 8 c.c. of water. The hot solution is added to the HgI_2 solution ; when cold, the volume is adjusted to 10 c.c. ; the liquid is then filtered, divided into suitable flasks or ampullae, and sterilized at 120°C. Each c.c. of solution contains 5 *millegrammes* of HgI_2.

Bengué's Balsam. (*Pharm. Zeit.*, **54,** 270.) Anhydrous wool-fat, 50 ; menthol, 15 ; methyl salicylate, 15 ; distilled water, 16. Mix.

Bile Salts, Preparation of, Undecomposed. Knoll. (*Apoth. Zeit.*, **24,** 54.) Ox bile is evaporated *in vacuo* to sp. gr. 1·040, and shaken out while warm with $CHCl_3$. After removing that solvent, the residual aqueous solution of bile salts is mixed intimately with powdered tragacanth, and set aside for the gum to swell. The homogeneous mucilage thus obtained is then "scaled" on glass at below 55°C. The powder obtained is almost white, soluble in water. It gives up the bile salts quantitatively to alcohol. The process is patented in Germany.

Boroglycerin Lanoline. (*Pharm. Zeit.*, **54,** 169.) Boric acid, 2 Gm.; glycerin, 18 Gm.; water, 10 Gm.; paraffin ointment, 20 Gm.; lanoline, 50 Gm.; oil of neroli, 2 drops; oil of bergamot and of lemon, of each 3 drops. A substitute for "Byrolin."

Canadian Formulae, New. (*Amer. Drugg.*, **54,** 105.) The following formulae have been proposed for incorporation in the Canadian Formulary for Unofficial Preparations:—

Linimentum Methylatis Compositum. Compound Liniment of Salicylate of Methyl. Linimentum Betulae Compositum.—Menthol, ℥i; chloral hydrate, ℥i; alcohol, ℥ii; tincture of Indian hemp, ℥ii; essential oil of camphor, ℥iv; methyl salicylate, sufficient to make ℥xx. Mix.

Liquor Petrolatum Compositum. Compound Liquid Petrolatum. Blandine Compound.—Camphor, ʒss; menthol, gr. viii; thymol, gr. iv; eucalyptol, gr. viii; oil wintergreen, ʒss; hydrastine, gr. ss; liquid petrolatum, white, sufficient to make ℥xx. Mix.

Unguentum Zinci Carbonatis Compositum.—Zinc carbonate, ʒi ℈i; salicylic acid, gr. x; lanolin, ʒi ℈i; petrolatum, white, ʒiv; benzoated lard, to make ℥i.

Syrupus Sulphatis Compositum.—Compound Syrup of Sulphate of Magnesium, Iron and Manganese.—Magnesium sulphate, ʒii; iron sulphate, gr. iv; manganese sulphate, gr. ii; diluted sulphuric acid, ♏ xx; liquor carmini, C. F. ♏ v; lemon syrup B.P., sufficient to make ℥i. M. s. a. [The "Latin" titles are given as in the original.—Ed. *Y.B.*]

Carter's Eye Lotion. (*Amer. Drugg.*, **54,** 332.) Zinc sulphate' 2 grains; boric acid, 20 grains; camphor water, ½ ounce; distilled water to make 2 ounces.

Cascara Sagrada, Bitterless Extract, Preparation of, by Means of ZnO. M. Penschuck. (*Apoth. Zeit.*, **24,** 162.) One kilo. of powdered bark is extracted with hot water, and the aqueous liquid concentrated *in vacuo*. This is then warmed on the water-bath at 60–70°C., with 60 Gm. of ZnO, for 4 or 5 hours. The trace of dissolved Zn is precipitated with a little Na_2CO_3 or K_2CO_3, and the liquid filtered. The filtrate is then evaporated *in vacuo* to dryness and powdered. The product is a slightly hygroscopic, zinc-free powder affording a clear orange-coloured solution with water.

Cascara, Liquid Extract of. F. Goldby. (*Pharm. J.* [4], **27**, 838.) Cascara in No. 20 powder, 100; alcohol 90 per cent., 20; glycerin, by volume, 10; distilled water, sufficient to produce 100.

Moisten the drug with 75 of the water, set aside for six hours, then pack in a percolator, and pour on distilled water until the fluid begins to drop from the lower orifice, then close the percolator, and allow it to remain closed for twelve hours, after which percolation is allowed to proceed at the rate of from forty to sixty drops per minute. Reserve the first 25 of percolate, which will be heavily charged with extractive, and should have a specific gravity of from 1·09 to 1·10. Continue the percolation until the bark is exhausted, evaporate the second portion of percolate to 37·5, add the reserved portion, then the glycerin and alcohol previously mixed, and sufficient distilled water to bring the volume to 100.

The resulting extract is equivalent to the B.P. preparation plus the glycerin, which may be omitted if desired. The addition of glycerin is useful as a preservative, and facilitates filtration.

Casein Skin Creams. (*Chemist and Drugg.*, **74**, 602.) (1) Skimmed milk, 1 gal.; powdered alum, 1 oz.; boric acid, 3 dr.; glycerin, 3 oz.; oil of bitter almond, 20 min.; oil of rose-geranium, 10 min.; carmine solution, q.s. Heat the milk to about 170°F. Dissolve the alum in 4 pints of hot water and add it to the milk slowly, with constant stirring. Continue the heat and stirring until precipitation is complete. Let the mixture stand until cool, pour off the clear liquor, add to the precipitate 1 gal. of water, stirring and breaking up the magma as much as possible. Allow this to stand until the precipitate separates, pour off as much as possible of the water, collect the precipitate on a cheese-cloth strainer, squeeze out all the water possible, then dry the precipitate without artificial heat between sheets of blotting-paper. Place the casein in a large mortar, add the glycerin, in which the boric acid has been dissolved, beat and rub the casein until it is perfectly smooth and soft. Let the mass stand for six hours, pour off the water that separates, then beat in the oils and carmine, adding a little more glycerin, if necessary, to bring to the proper consistence.

(2) Skimmed milk, 1 gal.; tartaric acid, 5 oz.; sodium benzoate, ½ oz.; zinc oxide, 1 oz.; glycerin, 2 oz.; carmine solution, perfume, of each q.s. Dissolve the acid in a pint of water and add to the warm milk. Strain and wash the coagulum. Rub the zinc oxide with the glycerin till perfectly smooth, and mix with the casein, adding lastly the perfume, colour, and preservative. (See also *Y.B.*, **1906,** 120, 123; **1907,** 244; **1908,** 303.)

Cement to Resist Acids. (*Annales Chim. analyt.*, **14,** 72.) Asbestos, 1; fine sand, 1; solution of sodium silicate, sp. gr., 1·320, 6 to 8. Mass. The paste quickly hardens, is unattacked by acids and not affected by heat.

Cetosan, a Water-absorbing Petroleum Basis for Ointments. F. Blatz. (*Pharm. Zentralh.*, **49,** 537.) Cetosan is a mixture of soft paraffin with the higher alcohols, mainly cetyl alcohol $C_{16}H_{33}OH$, and octodekyl alcohol, $C_{18}H_{37}OH$, derived from spermaceti. The latter is saponified with alcoholic KOH, the palmitic acid precipitated with $CaCl_2$, the Ca soap formed carrying down the higher alcohols with it. The precipitate is dried and extracted with petroleum ether, hot alcohol, or benzine. The higher alcohols are left on evaporating the solvent, and are mixed in the proportion of 1 : 20 with white or yellow petrolatum. The ointment basis thus obtained may be readily incorporated with water and aqueous solutions, and resembling eucerin (*Y.B.*, **1908,** 277) in this and other properties forming an elegant cream with an equal weight of fluid. Ceryl alcohol, $C_{26}H_{53}OH$, and myricyl alcohol, $C_{30}H_{61}OH$, from beeswax possess similar properties. It must be noted, however, that these alcohols do not possess the enormous water-combining power claimed by Lifschuetz for his preparation, but it is sufficient for all practical purposes. Cetosan is of better consistence than wool-fat, and combines better with liquids at low temperatures; it also keeps better.

Chemicals and Galenicals which cannot be obtained in Conformity with the Requirements of the Codex 1908. (*Bull. Sci. pharm.*, **14,** 287.) A commission of eminent pharmacists appointed to consider the characters and tests required by the

Codex 1908, have unanimously enumerated the following articles which cannot be obtained commercially to respond to the official requirements. The appended notes indicate the modifications required to render these requirements practicable. *Ethylic alcohol:* May contain traces of aldehyde. *Cape aloes:* May contain 5·4 per cent. of ash instead of 1 to 1·5. *Ammonium iodide:* May leave 0·25 to 0·5 per cent. of residue on calcination. *Ammonium valerianate:* May have a slight acidity. *Antimonial diaphoretic, washed:* Neutral to litmus; with 0·5 per cent. of nitrous products. *Tartar emetic:* Soluble in water 1 : 20 instead of 1 : 15. *Apiol:* Crystalline apiol is not found in French commerce; should not be included until its therapeutic action is worked out. *Balsam of Peru:* May contain essential oil. *Benzine*, pure: May contain traces of thiophene. *Bismuth gallate:* Should contain 52 to 53 per cent. of Bi_2O_3 instead of 56. *Calcium carbonate:* May contain traces of Fe. *Calcium diacid phosphate:* May contain 2·5 per cent. of free H_3PO_4. *Calcium monacid phosphate:* May contain sulphate, and chloride to the extent of 0·01 per cent. *Calcium neutral phosphate:* May contain 0·2 per cent. of Fe. *Animal charcoal:* Gives an empyreumatic odour when heated. *Chlorinated lime:* Not to require more than 9 or 10 per cent. of Cl. *Hydrochloric acid:* May contain traces of Fe. *Creosote* is not met with having the official characters. *Oil of turpentine:* a_D below $-40°$. *Iron arseniate:* Rapidly oxidizes and does not respond to official characters; partially insoluble in AmOH. *Ammonio-citrate of iron:* The amount of Fe required is slightly too high. *Iron oxalate:* The official anhydrous salt is difficult to obtain; the formerly official hydrated salt should be retained for its stability and its easy preparation. *Reduced iron:* May contain traces of S and of Fe_2O_3. *Glycerin:* All commercial glycerins reduce $AgNO_3$ in presence of NaOH. *Magnesia:* May contain traces of carbonate, sulphate, chloride, and Fe. *Magnesium sulphate:* May contain traces of Cl and of Fe. *Mercuric oxide, yellow:* May leave 0·2 per cent. of residue on calcination. *Mercurous iodide:* The same. *Basic mercuric sulphate:* May contain mercurous salts. *Petroleum ether:* May contain ethylene derivatives. *Phenol:* M.p. 41°C., not 42·5°C. *Piperazine:* Retain the hydrated form as more convenient. *Lead oxide:* The amount of Fe and Cu permissible to be definitely stated. *Potassium acetate:* May contain chlorides and sulphates. *Potassium chlorate:* The amount of chlorides permissible to be stated.

Potassium cyanide: May contain traces of S and of NaOH. *Potassium neutral sulphate:* May contain traces of Cl. *Potassium hydroxide:* May contain traces of Fe and of Cl. *Powdered asafetida:* Will not pass No. 30 sieve; use No. 15. *Powdered conium seeds:* Will not pass No. 45 sieve, use No. 9. *Powdered camphor:* Will not pass No. 30 sieve; use No. 9. *Powdered henbane seeds:* Will not pass No. 45 sieve; use No. 9. *Powdered soap:* Will not pass No. 37 sieve; use No. 22. *Powdered stavesacre:* Will not pass No. 30 sieve; use No. 9. *Sodium borate:* May contain traces of Cl and sulphates. *Sodium cacodylate:* The hydrated salt with 2 or 3 mols. H_2O to be official. *Sodium bicarbonate:* May contain traces of Cl and of neutral carbonate. *Sodium hypophosphite:* May contain phosphite and carbonates. *Sodium monosulphide:* Traces of S by treatment with HCl. *Resorcinol:* M.p. 110–111, not 119°C. *Tincture of cinnamon:* Does not give turbidity with an equal volume of water. *Tincture of drosera* is always reddish in colour. *Strychnine:* Soluble in water 1 : 50 and not 1 : 36·5. *Sodium salicylate:* May be faintly acid. *Sodium sulphate:* May contain 1 : 1000 of Cl and traces of Fe. *Sodium acid sulphate solution:* The same. *Saffron:* The official benzin reaction cannot be obtained. *Zinc chloride:* The clear 1 : 10 solution required cannot be obtained; may contain traces of oxychlorides. *Zinc phosphide:* May contain 2 per cent. of matter insoluble in HCl. *Lozenge pastes:* The official formulae contain too much sugar. The quantities of gums cannot be fixed, since their mucilaginous properties vary. The use of glucose is inevitable and necessary to prevent the paste from hardening. *Borax tablets:* Cannot be made with more than 5 Cgm. of borax. *Tablets in general:* May contain a trace of starch. *Capsules:* The weight of the envelope should not exceed 60 per cent. of the total weight; when only 50 per cent. the round form does not keep its shape. Formula for *glycerin suppositories* should contain 30 Gm. of cacao butter instead of 20 Gm. The *soft alcoholic extracts* of cinchona and of rhatany only keep well when dried. *Castor oil* by the Codex test always gives a colour reaction.

Cherry-laurel Water, Time of Year for Preparing. M. Bridel. (*J. Pharm. Chim.*, **28,** 358.) The question has arisen whether it is possible in the autumn to obtain cherry-laurel water containing 1 per mille of HCN. The author finds that in September a product may be distilled yielding 1·3 per mille. (See also *Y.B.*, **1908,** 271.)

Chlorinated Solutions, Official. E. J. Brown. (*Pharm. J.* [4], **28,** 293.) Chlorinated solutions can only be kept unchanged by maintaining the alkalinity. This is impracticable in the case of *Liquor calcis chlorinatae*, which should, therefore, be deleted from the B.P., only the *Liquor sodae chlorinatae* being retained. In the preparation of this, the amount of Na_2CO_3 used should be increased.

Chloroform in Lozenges, Determination of. E. Dowzard. (*Amer. J. Pharm.*, **80,** 511.) One-half or one weighed whole lozenge is heated in a flask under a reflux condenser with 70 c.c. of 2·5 per cent. solution of KOH in alcohol 75 per cent. The solution is gently boiled for 45 minutes, then 25 c.c. of water, a few drops of phenolphthalein solution, and sufficient dilute HNO_3 1 : 4 to give a slight acidity are added. Then 0·5 Gm. of pure $CaCO_3$ is added, and the liquid, when cold, is titrated with standard $AgNO_3$ solution (8·545 Gm. $AgNO_3$ in 1000 c.c.; 1 c.c. = 0·002 Gm. $CHCl_3$). The material must not be disintegrated, or considerable loss of $CHCl_3$ will result. A blank determination without any lozenge substance should be made with the same reagents, to eliminate error from any Cl present. The amount of Cl present in the lozenge basis not as $CHCl_3$ must also be determined. One lozenge is weighed, dissolved in 30 c.c. of hot water, acidified with a slight excess of HNO_3, treated with 0·5 Gm. of $CaCO_3$, and titrated as above with the standard $AgNO_3$ solution. The sum of the percentages of $CHCl_3$ equivalent to the Cl found in these two last determinations is then deducted from the result of the saponification experiment. $CHCl_3$ lozenges vary in keeping properties, and those with a licorice base appear to retain their $CHCl_3$ longer than those with a sugar base. A well made $CHCl_3$ and licorice lozenge may be heated for some time at 100°C. and yet retain a considerable amount of $CHCl_3$. The average loss of $CHCl_3$ in the process of manufacture of lozenges is about 50 per cent. The amount of $CHCl_3$ found in a lozenge may be expressed in minims by the following formula :—

$$\frac{C \times 0{\cdot}7104 \times L}{100}$$

when C = per cent. $CHCl_3$; L = average weight of lozenge.

Cod Liver Oil, Approximate Determination of, in Extract of Malt and Cod Liver Oil. M. I. Bedell. (*J. Pharm. Chim.* [4], **28,** 433.) Take about 35 Gm. of the sample and dilute with water to about 300 c.c. Mix well, and transfer to a graduated separator, and allow to stand for about twenty-four hours, till all the " cream " has risen and the lower portion of the liquid is clear. Then run off the clear liquid and break up the cream by the addition of strong H_2SO_4, little by little. On standing the oil will then separate in a clear layer, and its volume may be read off. By calculation from the sp. gr., the percentage of oil, by weight or by volume, can then be easily arrived at.

Cod Liver Oil Emulsion. B. Boerner. (*Apoth. Zeit.*, **24,** 211.) Decoction of Irish moss (1 : 100) 300, calcium hypophosphite 12, sodium hypophosphite 6, glycerin 100, are heated together. Powdered tragacanth 12, powdered gum acacia 12, are suspended in cod liver oil 420. This oily suspension is added to the hot solution and well mixed ; when cold, lime water 150, and aromatic spirit 33, are added, and the whole emulsified by hand or in a mixer. The aromatic spirit is thus composed :—Essential oil of almonds (without HCN), 2·5 ; oil of wintergreen, 2·5 ; cassia oil, 2·5 ; saccharin, 2 ; vanillin, 0·4 ; anhydrous Na_2CO_3, 0·3 ; alcohol 90 per cent., 330.

Collyria, Isotonic. A. Cantonnet. (*L'Union pharm.*, **50,** 60.) In order to obtain the best results with applications in solution to the eye, the vehicle should be isotonic to the lachrymal secretion, which contains approximately 14 *per mille* of NaCl. Consequently, the simple aseptic eye wash should be a solution of 14 Gm. of NaCl in 1,000 c.c. of sterile distilled water. NaCl should also be used for all eye solutions in which it is compatible with the active ingredient, in varying quantity to maintain the osmotic equilibrium. Thus collyria with 0·2 per cent. of a salt should contain 1·35 per cent. of NaCl ; with 0·5 per cent., 1·30 per cent. NaCl ; 1 per cent., 1·25 per cent. NaCl ; 2 per cent., 1·0 per cent. NaCl ; and 4 per cent., 0·6 per cent. NaCl. These proportions are sufficiently exact to be used with all the salts usually prescribed in eye lotions. With $ZnSO_4$ and $AgNO_3$, however, NaCl must not be used. These isotonic solutions are better applied tepid.

Dermatological Pastes. (*L'Union pharm.*, **37,** 189.) *Weisser's salicylated tumenol paste.* Salicylic acid, 1 ; tumenol, 3 to 5 ; zinc oxide, starch, of each 12 to 50 ; vaseline, 25.

Bodin's Paste.—Pyrogallol, 1 to 2·5 ; kaolin, starch, of each 10 ; vaseline, 30.

Leistikow's pyrogallol paste. Pyrogallol, 0·5 to 2·5 Gm.; ceyssatite (*Y.B.*, **1903**, 54), 3 Gm.; starch, 9 Gm.; vaseline, woolfat, of each 14 Gm.; fresh lemon juice, 5 to 10 drops.

Jessner's ichthyol paste. Ichthyol, 1; zinc oxide, starch, of each 12; vaseline, 25.

Besnier's salicylated naphthol paste. Naphthol, salicylic acid, resorcin, of each 5; starch, sulphur, vaseline, soft soap, of each 25.

Leistikow's acetic paste. Acetic acid, 5; ceyssatite, 10; rub down together and add, lanoline, 25; vaseline, 10.

Schleich's wax paste. Yellow beeswax, 90; KOH, 3·5; water, 150. Heat together and agitate until a homogeneous mass results. Allow to stand for two days, then beat to a paste in a mortar. It forms an excellent basis for dermatological use and alone forms an occlusive aseptic dressing. Substances which absorb water should first be rubbed down with an equal weight of vaseline before being mixed with this paste.

Diachylon Ointment. J. M. Good. (*Drugg. Circ.*, **53**, 65.) Lead plaster, 50; lavender oil, 1; petrolatum, 49. [Melt the lead plaster and the petrolatum on the water-bath; cool, and add the oil, then stir until cold.] This is of good consistence and keeps indefinitely.

Dispensing Problems. G. Simpson. (*Pharm. J.* [4], **27**, 801.) *HgI_2 in Pills*: These should be prepared by direct trituration and not by solution with KI, since the therapeutic activity is different. *Salicylic acid and sodium oleate in pills:* In the following pills, phenolphthalein ½ grain, salicylic acid 1½ grain, sodium oleate 1 grain, the salicylic acid liberates oleic acid. The salicylic acid and phenolphthalein should be massed with anhydrous woolfat, and the soap separately with the same excipient. The two masses are then mixed and stiffened with kaolin or althea. *Caffeine citrate and quinine or zinc valerianate in pills*: The citrate decomposes the valerianates, causing an oily separation. They should be massed separately with woolfat, mixed, and stiffened with kaolin.

Dispensers' Responsibilities. D. McEwan. (*Pharm. J.* [4] 28, 90.) Under the title "What shall I do? A Dispenser's Dilemma," the courses to be followed when prescriptions are received calling for dangerous doses of poisons are ably discussed. The problems considered are based on prescriptions which have actually been presented for dispensing in the ordinary course of business.

Dorsey's Magnesia Mixture. (*Amer. Drugg.*, **54,** 234.) Saturated solution of magnesium sulphate, 8; aromatic sulphuric acid, 1. Mix.

Durante's Iodo-guaiacol Mixture. D. Celli. (*Boll. Chim. farm.*; *Pharm. Zentralh.*, **50,** 485.) Powdered synthetic guaiacol, 20 Gm., is melted with gentle heat, and mixed with glycerin, 50 c.c.; iodine, 1 Gm. (or for a stronger solution, 2 Gm.), is then added, with cautious heating. After cooling alcohol 95 per cent., 10 c.c., and sufficient water to make the final volume 100 c.c. are added. The solution is clear, has the distinctive colour of iodine, and may be heated to 120°C. without decomposition. Its administration is unattended by any ill effects on the kidneys.

Elixirs, Flavouring, Improved Formulae for. F. M. Apple. (*Proc. Amer. Pharm. Assoc.*, **56,** 1026.) *Elixir Dulce* (*Elixir aromaticum*). Anethol, 12 minims; oil of coriander, 1½ minims; oil of nutmeg, 2 minims; tincture of vanilla, U.S.P., 1 fluid drachm; alcohol 95 per cent., 6½ fluid ounces; simple syrup, and distilled water, of each equal parts, sufficient to make final product 32 fluid oz.; purified talc, 1 oz. Prepared according to directions of the U.S.P. for aromatic elixir. [The solution of the essential oils in alcohol is mixed with the syrup, added gradually and the water added to the required volume. The talc is then suspended in the mixture and the liquid is passed through a wetted filter, the filtrate being returned until it is quite bright. *Tincture of vanilla U.S.P.* is composed of vanilla cut small, 100; sugar in coarse powder, 200; alcohol 96 per cent., and water, of each q.s. Alcohol, 650, is mixed with water, 350; the vanilla is macerated in 500 of this mixture for 12 hours. The liquid is drained off, and the residue uniformly disintegrated with the sugar in a mortar. The mass is transferred to a percolator and the strained liquid poured upon it. When this has percolated the percolation is continued with more menstruum so as to obtain 1,000 of finished product.]

Elixir Aurantii florum comp. Oil of cinnamon, 6 minims; alcohol, stronger orange flower water, of each 6 fl. oz.; simple syrup, 12 fl. oz.; distilled water, 8 fl. oz; purified talc, 1 oz. Prepare as above.

Elixir Dulce Rubrum. Tincture of cudbear, 6 drachms; compound tincture of cudbear, 2 drachms; sweet elixir to make 16 fl. oz.

Emollient Toilet Creams. (*Amer. Drugg.*, **54**, 41.) I. White wax, 1 oz.; lard, 4 oz,; water, warm, $3\frac{1}{2}$ oz.; sweet almond oil, $4\frac{1}{2}$ oz.; borax, powder, 15 grains; zinc oxide, 120 grains; oil of rose, 8 drops; oil of bergamot, 5 drops; oil of rose geranium, 5 drops; alcohol 90 per cent., 1 drachm.

Melt the wax and lard together, add the oil, then the warm water, with which the borax and zinc oxide have previously been mixed, stir the whole thoroughly in a mortar until well mixed and nearly cold, add the oils previously dissolved in the alcohol, and mix again.

II. Spermaceti, 2 oz.; white wax, $1\frac{1}{2}$ oz.; castor oil, $4\frac{1}{2}$ oz.; cottonseed oil, bleached, $6\frac{1}{2}$ oz.; rose water, $4\frac{3}{4}$ oz.; powdered borax, 120 grains; oil of rose, sufficient to flavour.

Melt the spermaceti and wax, add the castor and cottonseed oils, then incorporate the water in which the borax has previously been dissolved, and finally add the oil of rose.

III. White petrolatum, 100 parts; hard paraffin, 12 parts; borax (fine powder), 4 parts; tincture of benzoin, 4 parts; zinc oxide, 5 parts; glycerin, 5 parts; perfume, q.s.

Put the borax in a mortar and pour a small quantity of hot glycerin upon it, rubbing them together to form a solution; then add this to the melted petrolatum and paraffin (after they have become partially cooled), stirring as you pour it on. Next add the zinc oxide, previously rubbed to a smooth paste with the glycerin or petrolatum, and finally add the tincture of benzoin.

IV. White petrolatum, ℥x; Spermaceti, ℥i; white wax, ℥i; castor oil, ℥ii; lanoline ℥ii; powdered borax, ʒi; water, ℥iv.

Melt the wax, spermaceti and lanolin on a water-bath, add the petrolatum and the castor oil, then stir in the water and lastly the perfume.

V. Paraffin, 250; white wax, 260; white paraffin oil, 990; sodium perborate, 10; distilled water, 380 parts by weight; perfume, q.s.

Melt the paraffin and wax with gentle heat and then add the paraffin oil. If this addition causes the wax to congeal, continue the heat sufficiently, while stirring to remelt the mass. Now add the sodium perborate to the water and slightly warm the solution; then add this to the wax solution in a continuous stream, as large as the finger; at the same time briskly beat the emulsion with a wooden paddle until it becomes smooth. While the mass is cooling, add the perfume.

VI. Pure white wax, 40 Gm.; spermaceti, 10 Gm.; white petrolatum, 25 Gm.; liquid white petrolatum, 125 c.c.; coconut oil, 10 Gm.; powdered borax, 2·50 Gm.; powdered white castile soap, 1 Gm.; water, 75 c.c.; perfume, q.s. Melt the wax, spermaceti, petrolatum and oils on the water-bath. Rub the borax and soap in a mortar with the water until dissolved. Pour into a flask and heat until the upper portion of the flask is hot to touch, then pour slowly into the melted fats, stirring for five minutes; then remove from the heat and stir for ten or fifteen minutes. When cool, add the perfume.

VII. Spermaceti, ℥ss; white wax, ℥ss; sweet almond oil, ℥viii; cacao butter, ℥viii; elder flower water, ℥ii; balsam of Peru, ℥ss. Melt the wax and spermaceti and the cacao butter together; add the oil, and then mix in the perfumed water and balsam.

VIII. White petrolatum, ℥ix; white wax, ℥iss; spermaceti, ℥iss; distilled extract witch hazel, ℥iii.

IX. White wax, ℥iii; spermaceti, ℥iii; almond oil, ℥xvi; rose water, ℥viii. Melt the wax and spermaceti on a water-bath; when melted add the oil in several portions, stirring well the while. Now transfer the mixture to a heated Wedgwood mortar (which has been made hot by boiling water), then add the rose water (warm) in portions at a time, stirring well. Continue this until all the water has been added. Add perfume and beat up well until cold.

X. Quince seed mucilage, ℥x; almond oil soap, gr. xv; stearic acid, ʒiiss; glycerin, ʒss. Rub the stearic acid and soap in a mortar, add gradually the mucilage so as to form an emulsion. Lastly add the glycerin.

XI. White wax, ʒix; spermaceti, ʒix; water, ℥vii; sweet oil of almond, ℥vi; precipitated chalk, ℥i. Mix and melt by means of a water-bath; add 6 ounces more of oil of almond and stir until cold. When cold add chloroform, gtt. xii; otto rose, gtt. v.

XII. White petrolatum, ℥xii; beef suet (purified), ℥iv; white wax, ℥iv; spermaceti, ℥iv. Melt together and when cool perfume with oil rose, ʒi; oil rose geranium, ʒi; oil sandalwood, ʒss.

XIII. White liquid petrolatum, ℥x; white wax, ℥xii; spermaceti, ℥x ; lanolin, ℥xvi ; glycerin, ℥viii ; borax, ʒiii ; rose water, ℥xvi.

XIV. Lanolin, ℥i ; sweet almond oil, ℥i ; zinc oleate, ʒiii ; extract white rose, ʒiss ; glycerin, ʒii ; rose water, ʒii.

XV. White wax, ℥x ; paraffin, ℥x ; white liquid petrolatum, ℥liv ; cacao butter, ℥iv ; borax, ℥i ; water, ℥xx ; perfume, q.s.

XVI. White wax, lb. ss ; spermaceti, lb. i ; lanolin, lb. ss ; white petrolatum, lb. iiss ; cucumber juice, ℥xvi ; borax, ℥ss ; oil of rose, gtt. v ; oil of bitter almond, gtt. v ; oil of lemon, gtt. x. Melt the first four ingredients and strain. Heat the juice to boiling, dissolve in this the borax and add the grease. Stir until the mixture sets, then add the perfume oils.

Emulsification, The Theory of. C. R. Marshall. (*Pharm. J.* [4], 28, 257.) The physical aspect of the subject is fully dealt with and illustrated by diagrams and micro-photographs.

Emulsions, Separation of, for Analysis. F. R. Eldred and W. C. Bartholomew. (*Proc. Amer. Pharm. Assoc.*, 56, 838.) Twenty-five Gm. of the emulsion is treated with sufficient alcohol, 95 per cent. (usually from 100 to 150 c.c. will be requisite) to effect separation. The mixture is then filtered through asbestos in a tared Gooch crucible. The residue in the crucible is extracted with ether and after evaporation of adhering ether, is further extracted with alcohol, dried and weighed. This residue consists of emulsifying agents, free from oil, together with any other substances insoluble in alcohol and ether.

The original filtrate, together with the alcoholic and ethereal extracts, is evaporated to dryness, and extracted with several portions of ether. The residue contains the sugar, glycerin, sodium and potassium hypophosphites, and possibly other substances. Sugar and glycerin are separated by a mixture of equal parts of absolute alcohol and ether. The ethereal extract is evaporated, leaving the oil, which will contain any volatile oil and other ether-soluble substances present in the emulsion.

Eucerin Ointments. (*Pharm. Zeit.*, 54, 355.) Anhydrous eucerin is a useful basis for ointments containing liquids, such as the following cooling ointments : (1) Anhydrous eucerin, solution of aluminium acetate, equal parts. (2) Anhydrous eucerin, 2 ; solution of basic lead acetate, 1. (3) Anhydrous eucerin, 2 ; distilled water, 1 ; rose water, etc., as in cold cream. *Ophthalmic ointment :* Freshly precipitated yellow mercuric oxide, 1 ;

anhydrous eucerin, 2; paraffin ointment, 7. (See also *Y.B.* **1908**, 277.)

Extracts, Glucosidal, Preparation of, by Bourquelot's Method. L. Rosenthaler and K. Meyer. (*Archiv. Pharm.*, **247**, 28.) The employment of boiling alcohol as the extracting medium was found to lessen glucosidal decomposition in the case of gentian, cascara sagrada and rhubarb; but with *Rhamnus frangula* bark, no advantage resulted from its use; and with *Erythroea centaurea* herb cold alcohol gave a better glucosidal extract than hot. The use of $CaCO_3$ to prevent acid hydrolysis was found useless in all instances. [Since the drugs operated on were dry, probably a certain amount of enzyme hydrolysis had already taken place, and the activity of the ferment modified. The original method of Bourquelot applies to the fresh, living, glucosidal material.—Ed. *Y.B.*]

Extracts, Soft, Alkaloidal Deterioration of, by Keeping. H. Ribaut (*Bull. Sci. pharm.*, **15**, 495); J. Fricotel (*ibid.*, 687.) Ribaut publishes figures of analyses of a number of soft Solanaceous extracts, all of which show more or less alkaloidal loss during a period of 4 years. The smallest deterioration was found in one extract of belladonna root, which lost 1 per cent. of the total alkaloid originally present: other extracts of the same kind lost 3, 4, and 12 per cent. The highest loss was in an extract of hyoscyamus, showing a diminution of 69 per cent. of the original alkaloids. Fricotel confirms these results, and finds the same to occur in soft extracts of conium, aconite, and opium, as well as in solanaceous extracts. Monthly determinations for 6 months show this loss to be progressive. Since the same extracts, dried when made, retain their original alkaloidal strength unimpaired for this period, he attributes the loss of alkaloids to the moist condition of the extracts, and advocates the use of dry extracts of all alkaloidal drugs. (See also *Y. B.*, **1905**, 232, 236; **1906**, 154, 229.)

Fluent Powders for Dermatology. G. Pinkus and P. G. Unna. (*Apoth. Zeit.*, **23**, 88.) Easily mobile fluent powders, called "gleitpuder," are useful for application in certain skin diseases. Lycopodium is sometimes used, or the following mixture: Potato starch, 98; carnauba wax, 1; light magnesium carbonate, 1. This may be tinted flesh-colour with eosin solution, or brownish with an alcohol-ether solution of ichthyol. The following are two typical formulae : (1) Starch, 89 ; zinc oxide, 10 ; carnauba wax, 1 ; solution of eosin, 1 : 100, 5 ; solution of ichthyol 1 :100, 5. (2) Zinc oxide, 5 ; lycopodium, 100 ; eosin solution 1 :100, 10. In certain cases, alum, 10, may be prescribed, or BiOCl, or S, in the desired proportion with the above bases.

Fluid Glycerates. G. M. Beringer. (*Proc. Amer. Pharm. Assoc.*, **56**, 981.) The author gives further results of experiments with glycerin as a menstruum and modifies some of the processes. The " type " process is : Drug in coarse powder, 100 parts ; glycerin, 50 fluid parts ; distilled water, 150 fluid parts ; chloroform water sufficient to make the finished product measure 100 fluid parts. The drug is moistened with the mixed glycerin and water, packed very lightly in the percolator, covered with the menstruum, macerated for 2 days, then percolated. The first 50 fluid parts are reserved. When all the menstruum has been used, percolation is continued with $CHCl_3$ water to exhaustion. The second percolate is evaporated to 60 fluid parts ; the reserve mixed and evaporation continued to 100 fluid parts. If carried too far, the volume is readjusted with distilled water. The product is set aside for several days, the clear portion decanted and the rest strained. For the *fluid glycerates of aconite and belladonna leaves*, *belladonna root*, *hyoscyamus*, *stramonium* and *veratrum*, 2 parts of tartaric acid are added to the above quantities of menstruum. For the *bitterless fluid glycerate of cascara*, lime 5 parts is mixed with water 200, and the drug moistened therewith. The moist powder is dried at a moderate heat, then extracted as above, using 80 parts of the glycerin-water menstruum to moisten the drug. *Aromatic fluid glycerate of cascara* : Bitterless fluid glycerate of cascara, 750 ; fluid glycerate of licorice, 250 ; oil of fennel, 1 ; oil of cloves, 1 ; oil of cassia, 1. Mix. *Fluid glycerate of cinchona* requires 5 fluid parts of HCl for each 100 of bark. The acid is added to 100 of the glycerin-water menstruum and mixed with 100 parts of powdered bark. After standing for 24 hours the magma is transferred to the percolator and the general process followed. *Fluid glycerate of coffee* prepared by the type formula affords an excellent *syrup of coffee* by mixing 10 parts with 7 of simple syrup. For the *fluid glycerate of colchicum corm*, 10 parts of acetic acid, and for the same preparation of *colchicum seed* 15 parts of acetic acid are added to the menstruum. For *fluid glycerate of conium* 5 parts of acetic acid is also used, and for the *ergot* preparation, 2 parts, with 40 parts of menstruum. In the case of *Gambier* the drug is powdered with twice its weight of pumice stone to a uniform powder; each 300 parts of this is mixed with 100 parts of the menstruum and set aside for 24 hours; more menstruum is then added to give a pourable mixture, which is transferred to the percolator. With *Guarana* 250 parts of sand is used as the disintegrating medium. *Ipecacuanha* requires 10 parts of acetic acid for every 100 parts of drug, the acid being mixed with 50 parts of menstruum. *Lobelia* requires acetic acid, in the proportion of 25 parts to 100 of drug; and *nux vomica*, 5 parts of the same acid. *Fluid glycerate of senega* requires 5 parts of KOH solution with 50 parts of menstruum to moisten 100 parts of drug. In the case of *fluid glycerate of senna* 100 parts of drug is infused in warm water, 250; when cold, the liquid is strained off and the leaves pressed. The operation is repeated twice more. The bulked liquid is evaporated to 50, glycerin 50 is added and the product strained. It is impossible to percolate senna with a glycerin-water menstruum.

Fluoroform Water. V. Auger (*L'Union pharm.*, **49,** 281); Valentiner and Schwarz (*Bull. Soc. Chim.* [4], **5,** 5); V. Auger (*ibid.*, 7). Auger first stated that the so-called "fluoroform water 2·8 per cent.," exploited as a remedy for whooping cough, contains no fluorine. Valentiner and Schwarz reply, affirming that the product, which is the subject of two patents, is a saturated aqueous solution of fluoroform gas in water, but admitting that confusion has arisen over the strength, which refers to volumes of gas dissolved in water, and consequently the proportion by weight is 0·0715 per cent. To this Auger replies, criticizing Valentiner and Schwarz's two patents in detail; showing that only by one of them can fluoroform be produced at all; stating the insolubility of Valentiner and Schwarz's gas proves it not to be fluoroform; finding that 45 volumes of fluoroform is easily dissolved in 100 volumes of water; and giving details of the analysis of "fluoroform water," showing that 100 c.c. of liquid yield 2·24 c.c. of air and no fluoroform. This result is confirmed by Fourneau, working on a litre of the water.

Formaldehyde and Phenol for Disinfecting Rooms. W. B. Mac Laughlin. (*Med. Record; Nouveaux Remèdes*, **25,** 537). Formaldehyde solution (40 per cent.), 3 parts; phenol, 1 part.

Of this mixture about 10 oz. is sufficient to disinfect 1,000 cubic feet. A sheet moistened with the disinfectant is hung up in the room, which is kept closed for at least two hours ; an ordinary sheet will take a little more than 4 oz. of the liquid. The addition of phenol increases the penetrative and diffusive power of the formaldehyde.

Gebhardt's Rheumatic Tea Species. (*Pharm. Zeit.*, **53,** 808.) Guaiacum chips, sassafras chips, quassia chips, of each 2 ; liquorice root, restharrow root, pimpernel root, of each 1 ; senna leaves, 3.

Gelatin Capsules, Bunsen Bolt for Closing. J. A. Forret. (*Pharm. J.* [4], **28,** 418.) A device for closing gelatin capsules is illustrated and described.

Glycerin, Determination of, in Alcoholic Galenical Preparations. W. A. H. Naylor and E. J. Chappel. (*Pharm. J.* [4] **28,** 190.) Five c.c., or other convenient quantity, of the galenical containing about 0·5–1·0 Gm. of glycerin, is diluted with 50 c.c. of distilled water, and aqueous solution of lead subacetate added until precipitation is complete—great excess of the reagent being avoided. If the solution be warmed on the water-bath for a short time the precipitate usually settles out readily, and the point at which precipitation no longer occurs on addition of the lead subacetate can readily be seen. The mixture is filtered at the filter pump with the aid of a little kieselguhr, and the precipitate washed with three portions of 10 c.c. each of hot water. To the filtrate diluted H_2SO_4 is cautiously added, until the Pb is precipitated, care being taken to avoid more than a slight excess of the reagent. Solution of phosphotungstic acid is next added to the cold mixture until it no longer causes a precipitate, and the mixture again filtered as before, and the precipitate washed with three portions of 10 c.c. each of distilled water. The filtrate is concentrated to 10–15 c.c., and then rendered alkaline with NaOH solution and carefully concentrated at a low temperature to 3 to 4 c.c. ; 15 to 20 Gm. of $CuSO_4$ (dried at 110°C.) are mixed with the cooled residue. The $CuSO_4$ must be gradually added and precautions taken to prevent any great rise of temperature. The powdered mixture is then extracted with dry acetone in a Soxhlet apparatus for 7 or 8 hours. The acetone is distilled off and the residue in the flask dried at 85°–90°C. Glycerin extracted by the above process is generally coloured, and usually yields a few milligrammes of ash, but not sufficient to affect the results materially.

Glycocholic Paste, an Excipient for Blue Pill. — Anuxhat. (*Apoth. Zeit.*, 23, 739.) By digesting fresh lard, 1 part, with sodium glycocholate 2 parts, an excipient is obtained which is excellent for mercurial pill. These are prepared by triturating mercury 1 with this glycocholic paste 3, until the metal is killed. The mass is divided into suitable pills, which are coated with keratin.

Grey Oil and Calomel Injections for Syphilis. K. Zeiler. (*Muench. Med. Woch.*; *B.M.J. Epit.*, **1909, 1,** 67.) Redistilled mercury, 40 Gm., is thoroughly killed by trituration with sterilized pure lanoline, 15 Gm.; then dericinol, 45 Gm., is added. When properly prepared, the globules of mercury in this suspension do not exceed 2 μ in size. When the mercury is thus properly subdivided, the injections are painless and readily absorbed. Large doses, up to 0·14 Gm. of Hg, may be thus given to men; women do not stand high doses so well; for them 0·05 to 0·07 Gm. Hg is enough.

A basis is made with anhydrous camphorated lanoline 5 per cent., 1; camphorated dericinol 5 per cent., 2. Calomel, 4 to 5 Gm., is suspended in sufficient of this to make 10 c.c. With this, 0·112 to 0·12 Gm. of HgCl is given for a dose, repeated every 4 to 6 days. When calomel is required for intra-muscular injection, it must be quite pure, prepared by precipitation, and washed with ether or boiling alcohol, and manipulated in the photographic dark room.

Home-made Galenicals. W. Gartside. (*Pharm. J.* [4]. **28,** 266.) The preparation of galenicals in the pharmacy is strongly advocated.

Honey, Clarified. P. Schroeder. (*Berichte Pharm.*, **1909,** 212.) Honey, 1,000, is dissolved in water, 1,000. A solution of dry egg albumin, 5, in water, 100, is shaken up with $CaCO_3$ 2·5 and added to the honey solution, and well mixed. It is then heated to 100°C. and filtered.

Horse-Chestnut, Strong Tincture, Compound Tincture and Ointment of. S. Artault. (*Bull. Sci. pharm.*, **15,** 698.) *Strong Tincture:* Fresh decorticated sliced or pounded horse-chestnuts are macerated for several weeks with an equal weight of alcohol 70 per cent.; then strained, pressed, and filtered. This strong tincture is an excellent remedy for haemorrhoids. It is given in doses of 5 to 10 drops, twice daily with meals, increasing the dose if necessary by 5 drops at a time; as much as 50 drops may be given, but this is not often desirable. It is also useful for varicose veins. *Compound Tincture.* Strong tincture of horse-chestnut, 10; tincture of *Veratrum viride*, 10; tincture of aloes, 10; tincture of *digitalis*, 5. Dose, 35 drops three times a day in water. *Ointment:* Strong tincture of horse-chestnut, 1; lanoline, 6. Mix. For local application to haemorrhoids.

Horticultural Preparations. F. P. Sergeant. (*Pharm. J.* [4], **28,** 219, 255, 390, 524.) A series of practical articles giving formulae for weed killers, insecticides and other horticultural specialities.

Hydrastine, Compound Glycerite of. F. W. Nitardy (*Proc. Amer. Pharm. Assoc.*, **56,** 1034.) This is also known as "Colourless Hydrastis." Hydrastine hydrochloride, 5; aluminium chloride, 5; dilute hydrochloric acid, 1·5; glycerin, 500 fluid parts; distilled water to make 1,000 fluid parts. Dissolve the salts in water 100; add the acid and mix with the glycerin. Then make up to 1,000 with water.

Hydriodic Acid, Preparation of, for Pharmaceutical Use. G. Heikel. (*Amer. J. Pharm.*, **80,** 581.) A solution of FeI_2 is prepared in the usual manner. To this a slight excess of $BaCO_3$ is added, and the mixture boiled until a portion gives only a slight precipitate when filtered and treated with AmȮH. The whole is filtered, allowed to stand for 24 hours, and again filtered, when it should be free from Fe. If this be not so, it must again be boiled with $BaCO_3$. The iron-free solution of BaI_2 is then made up to a definite volume, the amount of Ba present is determined, and a very slight excess of the exact equivalent of dilute H_2SO_4 added to precipitate this as $BaSO_4$. The filtrate is then evaporated to the desired concentration, any trace of free I liberated being removed by a little dilute H_3PO_2.

Hydrocyanic Acid, Deterioration of Dilute Solutions of. V. Coblentz and O. May. (*Proc. Amer. Pharm. Assoc.*, **56,** 879.) It is found that 2 per cent. HCN kept in paraffin coated bottles showed a loss of 6 per cent. of the original HCN present in 9 months; the same kept in plain glass bottles lost from 10 to 54 per cent.; and samples containing traces of AmOH from 14 to 75·5 per cent. in the same period. This indicates the important part played by a trace of alkali in the deterioration of the acid. Diffused daylight has no important influence on the keeping properties of the acid. Acid prepared from AgCy keeps somewhat better than that made from K_4FeCy_6. This may be due to traces of HCl in the former, that acid being used to decompose the AgCy. Acetanilide and alcohol are no better preservatives than the HCl usually employed.

Ichthyol-Resorcinol Soap. J. Lothian (*Pharm. J.* [4], **27,** 801) and O. Helmers (*ibid.*, **28,** 56). Lothian finds that ichthyol, when combined with resorcinol and a superfatted soap basis, separates in leathery or rubber-like particles when the compound soap is dissolved in hot water. When salicylic acid is used instead of resorcinol, no such separation occurs. The cause is considered to be due to some reaction between the resorcinol and the ichthyol, which was apparently sodium ichthyol. Helmers replies that the cause is probably some impurity in the ichthyol, since genuine ichthyol under these conditions gives a resorcinol soap which is perfectly soluble. Many sulphonates of sulphuretted hydrocarbons are put forward as ichthyol.

Incompatibility of Codeine Phosphate with Excess of NaBr. F. Rachel. (*Pharm. Zentralh,* **1908, 49,** 1034.) In following prescription, codeine bromide is salted out by the excess of NaBr, as a finely-divided crystalline precipitate: Sodium bromide, 10 Gm.; codeine phosphate, 0·4 Gm.; water to make 150 Gm.

Incompatibility of HgO and Cocaine Hydrochloride. Meurin. (*Rev. Pharm.*, **1908,** 275; *Pharm. J.* [4], **28,** 291.) When either red or yellow HgO comes in contact with cocaine hydrochloride, decomposition results with formation of $HgCl_2$. An eye ointment in which these were prescribed together was found to occasion pain and irritation. Red HgO is less active than the yellow form in decomposing the alkaloidal salt, but both do so appreciably. The combination should not be prescribed for ophthalmic use.

Incompatibles in Prescriptions. P. Fenton. (*Pharm. J.* [4], **28,** 90.) (1) Ammon. bromidi, 2½ dr.; Magnes. Sulph., 6 dr.; Tinct. Nucis Vom., 1 dr.; Spirit Chlorof., 2 dr.; Aquam, ad 3 oz. Immediately this mixture is made up a dense crystalline precipitate is thrown down. This is evidently a magnesium salt. In dispensing the above the correct procedure is to add water up to 6 ounces, when a clear mixture is obtained, and double the dose.

(2) Plumbi Acet., 30 gr.; Acid. Acet. Dil., 2 dr.; Syr. Tolutan, 4 dr.; Syr. Limonis, 1½ oz.; Aq. Cinnamon, ad 6 oz. Misce. This mixture gives a white precipitate of lead citrate soon after making up. It may be assumed that the prescriber's intention here in adding Syr. Limonis is merely for flavouring. By using simple syrup, to which some tincture of lemon has been added, instead, the formation of the insoluble lead salt is prevented.

(3) Atropinae Sylph., 1 gr.; Strychnin. Hydrochlor., 2 gr.; Acid. Salicylic, 3 gr.; Sodii Biborat., 2 gr.; Aquae Destillat., ad 1½ oz. An abundant precipitate of alkaloids is caused by the borax. As at present directed, no attempt should be made to dispense the above.

(4) Potass. Chlorat., 20 gr.; Calcii Chloridi, 1 dr.; Acid. Sulphurosi, 2 dr.; Aq. Chlorof., ad 3 oz. Misce. When compounded as written, a copious precipitate is produced after standing about 2 hours or so. This is due to an interaction between the potassium chlorate and the sulphurous acid, as a result of which sulphuric acid is formed, which, in turn, then reacts with the calcium chloride to form calcium sulphate, thus :—

$$\begin{aligned} KClO_3 + 3H_2SO_3 &= KCl + 3H_2SO_4 \\ CaCl_2 + H_2SO_4 &= CaSO_4 + 2HCl \end{aligned}$$

The incompatibility should be pointed out to the prescriber, but if this is impossible it should not be made up.

Influenza Tea. (*Pharm. Zeit.*, **53**, 808.) *Centaurea minor* herb, *Trifolium fibrinum* herb, of each 2; yellow cinchona bark, triticum rhizome, dandelion root, of each, 1. Mix.

Inhalations for Rhinolaryngeal Affections. —Dubar. (*Bull. Sci. pharm.*, **15**, 529.) (1) Tincture of benzoin, 20; cherry laurel water, 100. (2) Oil of thyme, 20 drops; oil of *Pinus sylvestris*, 30 drops; menthol, 3 Gm.; eucalyptol, 2 Gm.; alcohol 90 per cent., 60 Gm.; cherry laurel water, 80 Gm. (3) Tincture of eucalyptus, 100 Gm.; tincture of benzoin, 20 Gm.; menthol, 4 Gm.; wood tar, 2 Gm.; oil of cedar, 20 drops. (4) Bromoform, 2 Gm.; phenol, 2·5 Gm.; beechwood creosote, cherry laurel water, 70 Gm.; alcohol 90 per cent., 50 Gm.; oil of lavender, 30 drops. A teaspoonful of either of the above is to be added to 750 c.c. of boiling water, in a suitable inhaler, and the vapour inhaled.

Injections for Lumbar Anaesthesia, Gum Acacia in. — Erhardt. (*Nouv. Remèdes*, **26,** 57.) The addition of 3 per cent. of gum acacia to injections for lumbar anaesthesia is stated to diminish the toxicity of the active ingredient and to lengthen the time of the anaesthesia.

Ipecacuanha, Liquid Extract of, Alkaloidal Strength of. (*Evans' Analyt. Notes*, **1908,** 19.) Commercial specimens of this preparation varied in strength from 1·65 to 2·02 per cent. of total alkaloids.

Iron-Protein Compounds. H. A. B. Dunning. (*Proc. Amer. Pharm. Assoc.*, **56,** 845.) *Iron albumin compounds.* (1) Egg albumin, 35; solution of iron oxychloride, 35; solution of NaOH, 1 : 10, q.s. The mixed solution of albumin and ferric oxychloride is neutralized with NaOH. The precipitate is washed, collected and drained. It is soluble in NaOH solution, but not to any extent in sodium citrate solution. (2) Egg albumin, 30; solution of Fe_2Cl_6, 15; solution of AmOH, 1 : 10, 12; sodium citrate, 5; NaOH, q.s. Add the AmOH to the Fe_2Cl_6 solution, slowly stirring until the precipitate formed is dissolved. The solution is diluted, mixed with the egg albumin, neutralized, and the precipitate collected. (3) Albumin, 25; Fe_2Cl_6, 5; NaOH, q.s. The precipitate collected in the usual way is not soluble to any extent in NaOH solution. *Iron peptonate compounds.* (1) Peptonized egg albumin, 25; solution of ferric oxychloride, 40; NaOH, q.s. The precipitate is formed and collected as described for iron albuminate. It is insoluble in NaOH. (2) Peptonized egg albumin, 25; Fe_2Cl_6, 5; NaOH, q.s. Resembles the similar iron albumin product. (3) Peptonized egg albumin, 30; solution of Fe_2Cl_6, 15; AmOH, 1 : 10 solution, 12; sodium citrate, 5 Gm.; NaOH, q.s. Prepared like the corresponding albumin compound. Soluble in sodium citrate solution.

Isotonic Liquids for Dressings and Surgical Washes. — Fleig. (*J. Pharm. Chim.* [6], **29,** 170.) Hitherto, isotonic solutions (NaCl 9 : 1,000) or para-isotonic solutions (NaCl 7 or 8 : 1,000) have been almost wholly limited in use as vehicles to liquids injected directly into the tissues. It is considered that they should also be employed for washes for wounds, both superficial and deep, and for all dressings of lesions where the surface has been deprived of its epithelium and where the subjacent tissues are laid bare. The cells of these, normally covered by epithelium, are always bathed, in a normal condition, by physiological liquid. Consequently when any liquid is applied to such surfaces, it should be so constituted that all harmful osmotic action should be avoided. This precaution would favour normal processes and hasten healing. In those cases where NaCl is incompatible with any of the drugs prescribed, Na_2SO_4 or $NaNO_3$ may be used to make the isotonic vehicle, or even sugars, solid glucose 45 : 1,000, or lactose or cane sugar 90 : 1,000. The use of these isotonic solutions is of special value for application to large surfaces such as burns, crushed limbs, and to ulcerated tissue. They should also be used for intestinal injections, vesical washings, and intranasal douches. H_2O_2 solution should be always rendered isotonic. (See also p. 139 *ante*.)

"Jecoral" Cod-Liver Oil Emulsion. (*Apoth. Zeit.*, **23,** 874.) Tragacanth powder, 5 Gm., is rubbed down with glycerin, 120 Gm., and the mixture is set aside for half an hour. Mucilage of acacia, 30 Gm., and water, 281 Gm., are then added, the whole being thoroughly mixed until a smooth, homogeneous mucilage results. To this cod-liver oil, 500 Gm., is added, in small quantities at a time, each portion being thoroughly emulsified. The product is then flavoured as desired; as, for instance, with essence of banana, 2 Gm.; extract of heliotrope, 2 Gm.; syrup of citric acid, 20 Gm.; oil of wintergreen, 5 drops; oil of cinnamon, 5 drops; rectified spirit, 40 Gm.

Kephaldol a Mixture. F. Zernik. (*Apoth. Zeit.*, **23,** 506.) Although this Austrian speciality is claimed to be a chemical compound, the specimen examined was simply a mixture of, approximately, phenacetin, 50; salicylic acid, 32; citric acid, 5; the latter combined with quinine, 4, and sodium.

Lanoline Cream. (*Pharm. Zeit.*, **54,** 292.) Lanoline, 100; white vaseline, 400; white vaseline oil, 50; spermaceti, 25; white wax, 25; rose water, 50; otto of rose, 1. [Melt the fats together, add the rose water, and beat to a cream; lastly add the otto.]

Lecithin, Preparation of a Product rich in. C. A. Fischer.

(*Apoth. Zeit.*, **23,** 898.) One part of yolk of egg is extracted at 15°C. with 5 parts of acetic ether in an extractor. The residue on distilling off the solvent and drying *in vacuo* contains from 30 to 45 per cent. of lecithin. By extracting at 70°C. and cooling the liquid extract, crystalline lecithin may be obtained.

Lemon Juice, Centrifugated. B. Stock. (*Pharm. Zentralh.*, **49,** 1027.) Lemon juice is now prepared in Sicily by centrifugation. The peeled lemons are crushed by passing through rollers armed with sharp projections, then thrown into the centrifugator. The yield of juice is almost the same as that obtained by pressing, and the pulp is more easily handled. Juice thus prepared contains less suspended matter than expressed juice and its flavour is better, since the bitter pips are not crushed. The method might be applied with advantage to the preparation of other fruit juices.

Liniment of Ammonia, White and Permanent. O. Raubenheimer. (*Proc. Amer. Pharm. Assoc.*, **56,** 1032.) Sesame oil, 3 parts by weight; solution of ammonia (10 per cent.), 1 part by weight. Mix. It is preferable to weigh rather than to measure the oil. The consistence of this liniment is satisfactory, and it does not thicken by keeping. (See also *Y.B.*, **1908,** 262, 299.)

Linoval, a New Ointment Basis. A. Salomon. (*Apoth. Zeit.*, **23,** 556.) The chief constituent of linoval is a volatile fatty acid obtained as a bye-product in the purification of linseed oil. This is collected by distillation into vaseline and then saponified with ammonia. Linoval has the following percentage composition: Vaseline, 93; linseed volatile fatty acid, 5; ammonia, 1; oil of lavender, to perfume, 1. This is known as "pure linoval." It forms a white, plastic unctuous mass with a peculiar odour. It absorbs 15 per cent. of water and retains its consistence indefinitely if it be not heated to its melting point, 31°C. It is a general basis, being miscible with all medicaments but mineral acids and alkalies. Linoval alone has a distinct bactericidal action.

Liquid Dentifrice. P. Cauldwell. (*Drugg. Circ.*, **52,** 614.) Tincture of green soap, 2 oz.; glycerin, 2 oz.; water, 6 oz.; alcohol 90 per cent., 6 oz.; peppermint oil, 15 minims; oil of wintergreen, 15 minims; clove oil, 3 minims; cassia oil, 3 minims; compound tincture of cochineal, to colour. Mix the water and spirit, add the glycerin and soap tincture, then the oils, lastly the colour. The soft soap, used to make the tincture, should be nearly neutral and quite odourless. The compound tincture of cochineal is made from : cochineal, bruised, 25 ; potassium carbonate, 4 ; dilute alcohol to make 100 fluid parts. Mix, let stand and filter.

Liquid Extracts, Sp. Gr. and Extractive Value of. J. Feldhaus. (*Pharm. Zeit.*, **54**, 57.) The following figures are the limits given by a long series of commercial samples of fluid extracts. They show extreme variation.

Liquid Extract.	Sp. Gr. at 15° C.	Extractive per cent.
Aurantii cort.	1·024 to 1·03	30 to 30·5
Cascarae sagradae.	1·030 ,, 1·070	15 ,, 29·5
Cascarae sagradae examaratum.	1·015 ,, 1·058	12·5 ,, 25·0
Castaneae vescae	1·045	18
Castaneae vescae dulce	1·233 ,, 1·300	57·5 ,, 73·0
Cinchonae succirubrae	1·018 ,, 1·998	20·0 ,, 40·0
Cimicifugae	0·90	8·0
Condurango, Ph. G. IV	1·029 ,, 1·170	13·0 ,, 26·5
Frangulae, Ph. G. IV.	1·01 ,, 1·031	9·5 ,, 19·5
Frangulae examaratum	1·015 ,, 1·032	14·5 ,, 20·0
Gossypii herb	1·020 ,, 1·026	8·5 ,, 17·5
Grindeliae robustae	0·948 ,, 1·036	11·0 ,, 15·0
Hamamelidis virg. cum fol.	1·025 ,, 1·06	10·0 ,, 25·0
Hydrastis canadensis, Ph. G. IV.	0·954 ,, 0·993	14·0 ,, 25 (Glycerin)
Jujubae baccarum.	1·019	8·0
Kolae	0·97 ,, 1·018	75 ,, 11
Myrtilli fol.	0·999 ,, 1·01	11·0 ,, 27
Rhei, U.S.P. VIII	1·012	32·5
Rhois aromat.	0·988	21·5
Rhois toxicodend.	0·923	15·0
Secale cornuti, Ph. G. IV.	1·013 ,, 1·055	10·5 ,, 16·5
Senegae U.S.P.	1·002 ,, 1·015	11·5 ,, 29·0
Spiraeae	0·970 ,, 0·998	5·5 ,, 16·5
Syzgii jambol. cort.	0·997 ,, 1·021	9·0 ,, 17·5
Syzgii jambol. sem.	0·946 ,, 0·986	12·5 ,, 17·0
Taraxaci, U.S.P.	0·99 ,, 1·051	6·0 ,, 20·0
Thymi	0·987 ,, 1·08	5·0 ,, 22·0
Uvae ursi	1·172	40·5 ,, 55 (Glycerin)
Valerianae, U.S.P.	0·95 ,, 0·978	6·0 ,, 14·0
Viburni prunifol.	0·946 ,, 0·992	9·0 ,, 22·0

Liquor Arsenicalis, Instability of. A. B. Lyons. (*Proc. Amer. Pharm. Assoc.*, **56**, 901.) Fowler's solution, under ordinary conditions, undergoes progressive oxidation, the arsenite present being gradually converted into arsenate, with probable loss of therapeutic activity. The precaution should be taken to keep the containers filled and to prepare a fresh batch at least once in 12 months. The presence of arsenate is best shown by the precipitate given with magnesia mixture. The precipitate obtained, treated with $AgNO_3$ and acetic acid, gives a brown precipitate in presence of arsenate. The official quantitative test only determines the amount of As_2O_3 present. The total As may be determined by complete oxidation and subsequent precipitation as magnesium arsenate. After keeping the solution for 18 months 34·4 per cent. of the As_2O_3 originally present was found to be converted into As_2O_5.

Liquor ferri albuminati. Beysen. (*Pharm. Zeit.*, **53,** 1023.) Solution of dialyzed oil, 126; simple syrup, 200; solution of caustic soda (sp. gr. 1·168 to 1·172), 3·5 parts by weight, are mixed. Fresh white of egg, 80, is diluted with water, 200, and added in small portions, with thorough shaking, to the first mixture. The weight is then made up to 1,000 with water.

Liquor formaldehydi saponatus. (*Pharm. Zeit.*, **54,** 444.) Solution of caustic potash, 26 Gm.; alcohol sp. gr. 0·830, 10 Gm.; redistilled oleic acid, 20 Gm.; formaldehyde solution 40 per cent., 44 Gm.; lavender oil, 3 drops.

Liquor magnesii carbonatis. A. W. Nunn. (*Pharm. J.* [4], **27,** 255.) A method for preparing this by means of the "Sparklet" syphon is described.

Lozenges, Improved Formulae for. G. M. Beringer, junr., and H. D. Kresge. (*Amer. Drugg.*, **54,** 361.) In the following formulae, the final product should weigh 1 Gm., and should be circular disc-shaped, except in the case of cubeb troches, which are usually preferred cylindrical. Each formula is for 100 lozenges. The powdered ingredients should be thoroughly mixed, volatile and flavouring substances are then to be added, and the whole quickly massed with water. The respective flavours have been carefully selected to blend with that of the active ingredient. *Trochisci Acid. Benzoic*: Benzoic acid, 3 Gm.; powdered tragacanth, 3 Gm.; powdered sugar, 94 Gm.; oil of cassia, 0·2 c.c. *Trochisci Acid. Tannic*: Tannin, 6 Gm.; tragacanth, 3 Gm.; sugar, 91 Gm.; otto of rose, 0·4 Gm.; rose water, q.s. to mass. *Trochisci Carbonis Ligni*: Powdered wood charcoal, 30 Gm.; tragacanth, 4 Gm.; sugar, 66 Gm.; vanillin, 0 3 Gm. *Trochisci Chloroformi Co.*: Chloroform, 3·5 c.c.; oleoresin of cubeb, 0·5 c.c.; tincture of capsicum, 1 c.c.;

powdered extract of licorice, 5 Gm.; powdered acacia, 3 Gm.; powdered elm bark, 5 Gm.; sugar, 82 Gm. *Trochisci Catechu*: Powdered catechu, 6 Gm.; tragacanth, 3 Gm.; sugar, 91 Gm.; cassia oil, 0·2 c.c. *Trochisci Guaiaci*: Guaiacum resin (No. 100 powder), 20 Gm.; tragacanth, 3 Gm.; sugar, 77 Gm.; oil of cassia, 0·1 c.c. *Trochisci Eucalypti Gummi*: Powdered red gum, 6 Gm.; powdered red rose leaves, 6 Gm.; tragacanth, 3 Gm.; sugar, 85 Gm.; oil of rose geranium, 0·1 c.c. *Trochisci Krameriae*: Extract of krameria, 6 Gm.; powdered tragacanth, 3 Gm.; powdered sugar, 91 Gm.; oil of rose geranium, 0·4 c.c.; stronger rose water enough to mass. *Trochisci Phenolis*: Phenol (crystals), 6 Gm.; tragacanth, 3 Gm.; sugar, 91 Gm.; oil of rose geranium, 0·4 c.c.; stronger rose water enough to mass. *Trochisci Phenolphthaleini*: Powdered phenolphthalein, 6 Gm.; powdered acacia, 10 Gm.; sugar, 84 Gm.; vanillin, 0·3 Gm.; carmine, 0·1 Gm. *Trochisci Potassii Chloratis*: Powdered potassium chlorate, 15 Gm.; tragacanth, 3 Gm.; sugar, 82 Gm.; vanillin, 0·5 Gm. *Trochisci Quininae Tannatis.* Quinine tannate, 6 Gm.; powdered tragacanth, 3 Gm.; powdered cacao, 30 Gm.; sugar, 61 Gm.; vanillin, 0·3 Gm.; saccharin (soluble), 0·1 Gm. *Trochisci Santonini*: Powdered santonin, 3 Gm.; powdered tragacanth, 3 Gm.; powdered sugar, 54 Gm.; powdered cacao, 40 Gm.; vanillin, 0·1 Gm. *Trochisci Santonini Compositi*: Powdered santonin, 3 Gm.; calomel, 3 Gm.; powdered tragacanth, 3 Gm.; powdered sugar, 51 Gm.; powdered cacao, 40 Gm.; vanillin, 0·1 Gm. *Trochisci Ulmi*: Powdered elm bark (No. 60 powder), 30 Gm.; powdered tragacanth, 1 Gm.; powdered sugar, 79 Gm.; oil of sweet birch, 0·2 c.c.

Maisin Solution for Pill-coating. — Gaudichard. (*L'Union pharm.*, **50,** 115.) Maisin, 35; alcohol, 25; acetic acid, 40. Dissolve. This forms a thin, pliable, stable, non-brittle coating by evaporation, which has been found by actual experiment on animals to resist the action of the acid secretions of the stomach better than gelatin, keratin or glutin. Maisin-coated pills are completely disintegrated in the intestine. (See also *Y.B.*, **1906,** 142.)

Mange Lotion. (*Drugg. Circ.*, **53,** 185.) Liquid storax, 5 c.c.; tincture of green soap, 15 c.c.; oil of birch tar, 1 c.c.; solution of potassium hydroxide, 5 c.c.; methylated alcohol, enough to make 100 c.c. Mix, and after two days, filter. To be applied twice a week after washing.

Massage Ointment or Toilet Cream. C. E. Stimson. (*Proc. Amer. Pharm. Assoc.*, **56,** 972.) White wax, 250; liquid paraffin, 500; borax, 2; rosewater, 75; orange-flower water, 75.

Mercuric Iodide Oil. P. Lemaire. (*Répertoire*, **1909, 1.**) The *Codex* oil, containing 0·2 Gm. HgI_2 in 50 c.c. of sterilized oil, is not strong enough. The following is a more effective preparation: HgI_2, 1 Gm.; sterilized castor oil, 50 c.c.; guaiacol, 3 Gm.; poppy seed oil, purified with alcohol and sterilized, to make 100 c.c. To be protected from light.

Mercury Oxycyanide Solution. E. Rupp and F. Lehmann. (*Apoth. Zeit.*, **23,** 793.) Commercial "oxycyanide" of mercury is nothing but mercuric cyanide. A 10 per cent. solution of true oxycyanide may be made thus: $HgCl_2$, 5·8 Gm., and $HgCy_2$, 5·4 Gm., are dissolved in a small volume of water, and made up to 800 c.c. with more water. N/KOH solution, 42·8 c.c., is then gradually run in with agitation, and the volume finally adjusted to 1,000 c.c. (or kilo if desired). The equivalent of N/NaOH may be used if desired. The small amount of KCl or NaCl in the product is negligible. The reaction is expressed by the equation:—

$$HgCy_2 + HgCl_2 + 2KOH = HgCy_2HgO + 2KCl + H_2O.$$

The above quantities are not exactly the theoretical figures, but in practice are found to give the compound indicated. A slight excess of $HgCl_2$ and of $HgCy_2$ is prescribed, as these salts are rarely chemically pure.

Mercury, Purification of. W. Bettel. (*Apoth. Zeit.*, **23,** 418.) The metal is well agitated with a 2 per cent. solution of KCN, to which is gradually added solution of $Na_2S_2O_8$ 29 : 1,500. The mercury thus treated is purer than that obtained by distillation *in vacuo* and the cost is less.

Methylene Blue, Method of Administration and Doses. — Bressy. (*L'Union pharm.*, **50,** 119.) Methylene blue may be given in pills, cachets, or solution, in doses of 3 to 5 grains in 24 hours. Each pill or cachet should contain 1 to 1½ grains. Hypodermically it is used in 1 : 20 aqueous solution (sterilized), in doses of 1 to 2 c.c. to determine the degree of renal permeability. As an external application, a 1 : 200 aqueous solution applied daily as a dressing has given good results with soft gangrenous chancres.

Milk, Citrated, for Artificial Feeding of Infants. F. Langmead. (*Med. Press*, **87**, 241.) By simply adding 2 grains of sodium citrate to each ounce of cow's milk, the fluid may be used undiluted, directly for the feeding of infants. This addition of citrate prevents the formation of the hard clot of curd which renders cow's milk indigestible in the human infantile stomach, and renders the coagulum soft and flaky like that of human milk. Dilution with water and addition of cream to the cow's milk are both then unnecessary. For convenience the amount of citrate for a feed should be dissolved in a drachm of water. Directions should be given to bring the milk to the boil, then add a teaspoonful of the liquid. For instance, for a 4 oz. feed, the solution will contain 8 grains of sodium citrate in the drachm. The method has been very successful in a large number of cases.

Mixtures containing $MgSO_4$ and KBr or AmBr, Crystallization of. J. Lothian. (*Pharm. J.* [4], **28**, 292.) The following mixture quickly throws down a crystalline deposit: Ammon. bromid., ʒiiss; mag. sulph., ʒvi; tinc. nucis vom., ʒi; spirit. chlorof., ʒii; aquam. ad. ℥iii. The deposit formed consists of magnesium-ammonium sulphate, the reaction taking place thus:—

$$MgSO_4,7H_2O + 2NH_4Br = (NH_4)_2SO_4 + MgBr_2 + 7H_2O.$$
$$MgSO_4,7H_2O + (NH_4)_2SO_4 = Mg(NH_4)_2(SO_4)_2,6H_2O + H_2O.$$

When KBr is prescribed in a similar mixture the crystals which form being magnesium potassium sulphate and not K_2SO_4 as supposed. The reaction takes place:—

$$MgSO_4,7H_2O + 2KBr = K_2SO_4 + MgBr_2 + 7H_2O.$$
$$MgSO_4,7H_2O + K_2SO_4 = MgK_2(SO_4)_2,6H_2O + H_2O.$$

Mouth Washes. S. P. Mummery. (*Practitioner*, *May*, **1909**; *Pharm. J.* [4], **28**, 684.) An effective general disinfectant for the mouth is the following: Saccharini, gr x; acid. benzoic., gr xiv; tinct. krameriae, ʒi; ol. menth. pip., ♏ii; ol. cinnam., ♏ii; alcohol absol., ℥i. One part of this wash to nine parts of water, held in the mouth for one minute, will effectively sterilize the oral cavity. The saccharin is found to add considerably to the value of the wash.

A simple form of the wash is as follows: Acid. benzoic., gr. xviii; tinct. eucalypti, ʒiss; alcohol absol., ʒx; ol. menth. pip., ♏iv. A teaspoonful to half a glass of water.

A very excellent mouth-wash for chronic septic gingivitis, such as occurs in pyorrhoea alveolaris, can be composed with the addition of salicylic acid, thus: Acid salicylic, acid benzoic, aa. gr xvi; tinct. krameriae, ʒiss; alcohol absol., ℥i. A teaspoonful to a small wineglassful of water.

Nasal Applications, Pharmacy of. — Dubar. (*Bull. Sci. pharm.*, **15,** 637.) *Aspirations and washes*: Sterile solutions of NaCl and of $NaHCO_3$ 1 : 1,000, used tepid, according to directions. Sometimes a solution $KMnO_4$ 1 : 2,000 is prescribed, or a dilution of phenosalyl. *Powders*: Milk sugar is the general basis. All powders should be impalpable. The following is a typical prescription: Boric acid, lactose, of each 24; aristol, 4; menthol, 2; camphor in powder, 1. A pinch to be taken 4 or 5 times daily. *Oily sprays*: Sterilized olive oil is recommended as the vehicle, thus: Sterilized olive oil, 60 c.c.; resorcin, 2 Gm.; menthol, 1 to 3 per cent.; camphor, 1½ to 2 per cent. *Nasal instillations*: Mostly used for infants. Administered to the recumbent patient by means of a blunt nozzled syringe, gently, drop by drop. H_2O_2 is thus administered, diluted with equal vols. of boiled water; also oily solutions of iodine, or other drugs as prescribed. *Ointments* of various consistence are prescribed by specialists; thus (1) Resorcin, 2; boric acid, 10; vaseline, 100. (2) Menthol, 1; precipitated sulphur, 2; aristol, 4; lanoline, 250; vaseline, 50. (3) Camphor, 3; stovaine, 2; aristol, 8; lanoline, 300; vaseline, 100. (4) Adrenaline solution 1 : 1,000, 12 drops; cocaine hydrochloride, 10 Cgm.; resorcin, 20 Cgm.; precipitated sulphur, 20 Cgm.; lanoline, 15 Gm.; vaseline, 5 Gm. These are introduced into the nostril by means of a stick the size of a match, on absorbent wool. The patient should be instructed to sniff, not to blow the nose for some time afterwards and to assume a recumbent position for a few minutes after the application. No uneasiness should be felt if particles of the ointment reach the nasopharynx.

Ointment Pencils. (*L'Union pharm.*, **50,** 263.) These are chiefly prescribed for treating skin affections of the face. *Unna's zinc oxide ointment pencil*: Zinc oxide, 4; beeswax, 5; lanoline, 11. *Unna's sulphur ointment pencil*: Sulphur (precipitated), 1; beeswax, 3; lanoline, 6. *Audrey's ointment pencil*: Hard paraffin, 2; oil of theobroma, 14; melt together. Zinc oxide, or sulphur, 3; olive oil, 2; rub to a smooth mass. Mix the two masses and mould in oiled glass tubes.

Opotherapic Extracts, Influence of Method of Preparation on. E. Choay. (*Bull. Sci. pharm.*, **15,** 440.) Experiments show that the method of preparation of extracts of animal organs profoundly modifies their activity, especially in the case of those containing ferments. The process of drying by means of heat is generally condemned. Full activity can only be retained by rapid drying in high vacua, under a pressure of not more than 1 mm. Under these conditions, not only is the destructive action of prolonged exposure to heat and air avoided, but the modifying effect of autilysis is eliminated, drying proceeding with great rapidity. The products are spongy, easily powdered masses, free from marked odour and colour.

Orange and Lemon, Official Preparations of. P. Boa. (*Pharm. J.* [4], **28,** 294.) Sufficient use is not made in pharmacy of preparations of orange and lemon as flavouring agents. This is partly due to the unsuitable character of the official tinctures, which, being made with strong spirit, are unduly loaded with the terpenes of the peel. They cannot be prescribed even as syrup in sufficient quantity to impart a flavour without disturbing the patient's digestion. In consequence, syrup of orange of the present B.P. is less prescribed than that of the former edition, made from dried peel. Lemon syrup is still more rarely ordered, and aromatic syrup with equal rarity. These preparations may be improved thus :—

Tincture of orange. Fresh bitter orange peel, cut small, 25 oz. ; alcohol 90 per cent., 52 fluid oz. ; distilled water, 48 fluid oz. Prepare by the maceration process.

Syrup of orange. Tincture of orange, as above, 1 fluid oz. ; syrup, 7 fluid oz. Mix.

Aromatic syrup. Fresh bitter orange peel, cut small, 12½ oz. ; alcohol 90 per cent., 52 fluid oz. ; cinnamon water, 48 fluid oz. Prepare a tincture by the maceration process, filter clear and add an equal volume of syrup.

Tincture of lemon. Fresh lemon peel, cut small, 25 oz. ; alcohol 90 per cent., 52 fluid oz. ; distilled water, 48 fluid oz. Prepare by the maceration process.

Syrup of lemon. Citric acid, 4 oz. ; refined sugar, 5½ lb. ; distilled water, 42 fluid oz. or q.s. ; tincture of lemon, as above, 5 fluid oz. Heat the water to boiling-point, add first the sugar, then the citric acid, and stir till dissolved. When cold add the tincture of lemon and mix by shaking. Finally add sufficient distilled water to make the product measure 100 fluid oz.

Syrup of lemon without acid. Tincture of lemon, as above, 1 fluid oz.; syrup, 7 fluid oz. Mix.

Pancreatin, Inhibiting Effects of Sodium Bicarbonate on the Amylolytic Action of. C. E. Vanderkleed and L. H. Bernegau. (*Proc. Amer. Pharm. Assoc.* **56,** 941). The presence of $NaHCO_3$ in pancreatin powder in greater proportion than 33·3 per cent. reduces the amylolytic power of pancreatin markedly. *Compound pancreatic powder* should, therefore, have the formula thus amended: Pancreatin, 2; sodium bicarbonate, 1; milk sugar, 7.

Pepsin, Compound Powder, and Compound Elixir of. G. M. Beringer. (*Amer. Drugg.*, **54**, 293.) The following are improvements on the N.F. formulae:—

Compound powder of pepsin. Powdered pepsin (so-called insoluble variety), 15 Gm.; pancreatin, 15 Gm.; diastase, 1 Gm.; lactic acid, 1 c.c.; hydrochloric acid, 2 c.c.; sugar of milk, a sufficient quantity to obtain 100 Gm. of finished product. Add the acids gradually to 60 Gm. of milk sugar and triturate until thoroughly mixed. Mix the pepsin, pancreatin and diastase and incorporate this with the acidified milk sugar. Weigh, and add sufficient milk sugar to make the weight 100 Gm. Triturate the mixture thoroughly, and finally rub through a hair sieve. Preserve in well-stoppered bottles.

Compound elixir of pepsin. Pepsin (soluble "scales or granular" variety), 15 Gm.; pancreatin, 15 Gm.; diastase, 1 Gm.; lactic acid, 1 c.c.; hydrochloric acid, 2 c.c.; glycerin, 250 c.c.; alcohol (95 per cent.), 200 c.c.; oil orange, 2 c.c.; cudbear, 1 Gm.; water, a sufficient quantity to make 1,000 c.c. Mix the acids with the glycerin and 500 c.c. of water; add the pepsin, pancreatin and diastase, and macerate with occasional agitation until solution is effected. Then gradually add the alcohol, in which the oil of orange has been dissolved, agitating after each addition. Now add the cudbear and sufficient water to make the measure 1,000 c.c. Macerate for six hours with occasional shaking, then filter.

Pharmacy Notes. H. Wyatt. (*Pharm. J.* [4], **27,** 584.) A number of practical dispensing problems, met with in the course of business, are discussed.

Phosphorized Oil. H. Korte. (*Pharm. Zeit.*, **53,** 655.)

Oil of sweet almonds containing 1 per cent. of limonene, or of perfectly dry lemon oil, is the best oil for the preparation of phosphorized oil. If carefully stored in the dark this will be practically permanent; it has been found to retain 99 per cent. of its free phosphorous for 7 months.

Pill Coating for Drugs for Intestinal Medication. L. Danzel. (*L'Union pharm.*, **50,** 59.) The following solution is preferable to keratin or salol for coating pills to render them insoluble in the stomach, but easily disintegrated in the intestines. Benzonaphthol, 6; tannigen, 10; salol, 20; alcohol 90 per cent., 30; ether, 100. Dissolve. Coat the pills with a little of the solution in a spherical box and dry.

Pill Excipients, Comparative Value of, for Prompt Disintegration. — Rieben. (*Revist. Chim. farm.*, **1908,** 58; *Répertoire*, **21,** 81.) Pills of KI massed with a number of excipients were administered, and the time required to enable I to be detected in the urine was noted, as indicating the most quickly absorbed pill. Excipients containing vegetable powders gave the best results; licorice being first, then marsh-mallow. They retain this property for 15 days and only dissociate more slowly after having been kept for 2 months. Soap also gives fairly good results as regards rapidity of absorption. Wax and oil with starch, and sugar with gum are the worst disintegrators; kaolin, kaolin and syrup, or kaolin and wool-fat are better; while kaolin and vaseline, and kaolin, glycerin and water disintegrate a little slower. Silvered pills disintegrate more slowly than those unsilvered.

Quinine Hydrochloride Injections with Ethyl-Urethane. G. Giemsa. (*J. Pharm. Chim.* [6], **28,** 405.) Ethylurethane is proposed as a solvent for quinine hydrochloride for injection, thus: Quinine hydrochloride, 10; distilled water, 18; ethylurethane, 5. This solution may be sterilized by live steam for 30 minutes without being decomposed. Ethylurethane is preferable to urea, which has been used for increasing the solubility of the alkaloidal salt in water, since it is markedly more stable under these conditions.

Rennet Essence. (*Amer. Drugg.*, **54,** 106.) Rennet, fresh, ℥i; kaolin, gr. xl; alcohol, ʒiiss; sherry, ʒiiss; glycerin, ʒiiss; sodium chloride, ʒiiss; lactic acid, sp. gr. 1·21, gr. v; chloroform water, q.s. ad., ℥iii.

Rub the rennet well with the salt, then cut it up into small pieces and macerate with about 1½ oz. of chloroform water and the glycerin. After 4 days the alcohol and sherry are added, and the whole allowed to stand 3 days more before straining. The liquid is then shaken with the kaolin and set aside for a week. Finally, the clear solution is decanted and the remainder filtered ; the lactic acid is then added, and the required volume made up with chloroform water.

Resorcinoform. D. Monteil. (*L'Union pharm.*, **50,** 159.) Resorcinol, 110 Gm., is dissolved in commercial formol solution, about 100 Gm. The cold solution is then treated with sufficient HCl to precipitate a rose coloured mass. The addition of the acid causes a marked rise in temperature and the mixture soon forms a mass which must be kept well stirred. It is then collected, drained and dried at 25°C. It forms a red odourless, tasteless antiseptic powder, suitable for use as a dressing for wounds.

Recent Prescriptions, Analysis of 2,000. J. W. Walton. (*Pharm. J.* [4], **28,** 57.) A detailed review, which includes 1,359 mixtures, 125 powders, 124 ointments, 63 cachets, 42 pills, 85 lotions, 52 liniments, 60 tablets, 40 capsules, 31, solutions, 29 gargles, 19 paints, 15 lozenges, 29 applications, 22 inhalations, 17 drops, 12 draughts, 6 effervescent mixtures, 6 blisters, 6 suppositories, 5 emulsions, 4 mouth washes, 4 granules, 3 plasters, 3 jelloids, 3 cocoids and palatinoids, 3 jellies, 2 hair washes, 1 confection, 1 injection. The paper relates to dispensing business in the Manchester district.

Rubber Plasters. (*Apoth. Zeit.*, **24,** 406.) *Rubber adhesive plaster*: Anhydrous wool-fat, 134, is melted with copaiba balsam 16, and heated for a short time to 100°. To the partly cold mixture, petroleum benzine, 30, and a solution of caoutchouc, 50, in petroleum benzine, 300, are added. Then powdered orris, 50, in the finest powder, previously rubbed down with a little benzine, is added and thoroughly shaken up with the mixture. The liquid plaster is then spread on shirting. *Rubber plaster with* 20 *per cent. zinc oxide*: Anhydrous wool-fat and copaiba in the same proportions are melted together as above ; when cold zinc oxide, 57, and powdered orris, 27·5, are incorporated to form a homogeneous mass. It is gently warmed and mixed with petroleum benzine, 60, and added with thorough shaking to a solution of caoutchouc, 50, in petroleum benzine, 300. The liquid plaster is then spread on shirting. Para rubber is the best for the purpose: it should be dissolved in the petroleum benzine in the cold in well stoppered bottles: it takes 7 days to take up. Heat should be avoided. The plaster mixture is best made in a cylindrical vessel to avoid the formation of lumps, especially when ZnO is used. If the mass is too thick when the ZnO is mixed, the mortar should be stood in hot water; it must be thoroughly and evenly incorporated. The same applies to the powdered orris, which should be in the finest powder, and first rubbed down to a smooth paste with a little petroleum benzine.

Salophene, Adulterated. F. Zernik. (*Apoth. Zeit.*, **23**, 817.) A specimen of Swiss salophene had the m.p. 165°C. to 180°, instead of 190° sharp. It was found to be adulterated with 25 per cent. of acetanilide.

Schillbach's Cholera Drops. (*Pharm. Zeit.*, **54**, 426.) Tincture of angelica, 2; tincture of calamus, 2; tincture of cloves, 1; tincture of cubebs, 1; tincture of cinnamon, 1; tincture of opium, 2; tincture of saffron, 2; dilute alcohol 69 per cent., 11; all by weight.

Schleich's Pastes and Marble Soap. (*Pharm. Zeit.*, **54**, 232.) *Pasta cerata*: Yellow wax, 10; strong solution of ammonia, 1; distilled water, 15. *Pasta stearata*: Stearic acid, 100; strong solution of ammonia, 8 to 10; distilled water, 150. *Marble soap*: Yellow soap, 75; hot water, 150; dissolve and add wax paste and stearin paste, as above, of each 15; marble in fine powder, 700; boil for 90 minutes and add water 30.

Silver Leaf, Spurious. F. H. Alcock. (*Pharm. J.* [4], **27**, 653.) The fraudulent substitution of aluminum foil for silver leaf is recorded. The specimen was of German origin.

Skin Creams with Sodium Stearate. (*Chem. and Drugg.*, **74**, 637.) In the following formula, the sodium carbonate used should be the monhydrated form known commercially as crystal soda.

Chicago cream. Stearic acid, 240 gr.; sodium carbonate, 155 gr.; powdered borax, 30 gr.; glycerin, 1 oz.; oil of ylang ylang, 20 min.; heliotropin, 5 gr.; otto of rose, 5 min.; alcohol, 1 oz.; water, 8 oz. Place the stearic acid, sodium carbonate, borax, glycerin, and water in a water-bath and heat until effervescence ceases. Remove from the source of heat and stir at intervals until the mixture begins to set. Then add the perfumes dissolved in the alcohol and beat up with an egg-whisk. If the mass is not smooth enough it should be beaten up again on the following day.

Hamamelis cream. Stearic acid, 2½ oz.; sodium carbonate, 3 dr.; glycerin, 3 dr.; solution of hamamelis B.P., 12 oz.; water to make 25 oz. Place the stearic acid in a water-bath and when it is melted add the sodium carbonate and glycerin dissolved in 2 oz. of hot water. Heat with constant stirring until effervescence ceases, remove from the source of heat, add water to make the product weigh 13 oz., and finally the solution of hamamelis. Stir till smooth, heating a little if necessary, and beat to a foam in a warm mortar.

Stanislaus's skin-cream. Stearic acid, 30 Gm.; oil of theobroma, 5 Gm.; sodium carbonate, 20 Gm.; borax, 5 Gm.; glycerin, 25 c.c.; terpineol, 2 c.c.; oil of bitter almonds, 1 min; otto of rose, 10 min.; alcohol, 30 c.c.; water, 400 c.c.; mucilage of tragacanth, 100 c.c. Place the ingredients, except the perfumes and alcohol, in a water-bath and heat until effervescence ceases. Remove from the heat, and when the mixture begins to harden add the perfume dissolved in the alcohol and well mix. Allow it to harden, then warm and beat vigorously until a fluffy cream results.

Caldwell's cream. Stearic acid, 12 oz.; glycerin 12 oz.; water, 24 oz.; potassium carbonate, 4 dr.; borax, 1½ dr.; powdered tragacanth, 4 dr.; perfume, q.s. Place the glycerin in a water-bath, heat to 150°F., and add the tragacanth previously rubbed with a little alcohol. Next add the stearic acid, continue the heat until the acid is melted, and add the borax and potassium carbonate, dissolved in hot water. Stir until the mass begins to set, and add the perfume.

Peroxide cream. Stearic acid, 3 oz.; sodium carbonate, 2½ dr.; anhydrous wool-fat, 4 dr.; glycerin, 3 oz.; borax, 1 dr.; solution of hydrogen peroxide, 4 dr.; water, 16 oz.; perfume, q.s. The H_2O_2 is added when the mass, prepared as in the previous recipe, is setting.

Rolling cream. Stearic acid, 4 oz.; glycerin, 4 oz.; water, 16 oz.; potassium carbonate, 1 dr.; boric acid, ½ oz.; casein, soluble, 1 oz.; powdered tragacanth, 15 gr.; china clay, 3 oz.

carmine solution, q.s.; perfume, q.s. This is used as a massage cream.

Soaps, Officinal. (*Evans' Analytical Notes*, **1908**, 34.) *Animal soap.* No commercial curd soap has been met with made entirely from animal fat. The Reichert Meissl value of the soluble fatty acids ranges from 2·7 to 3·8 and of the insoluble acids from 2·7 to 6·3.

Castile soap. The mottled variety is almost invariably prepared from sesame oil. Of 30 samples of white soap examined 6 were doubtful or prepared from other than olive oil.

Palm oil soap. The Reichert Meissl value of the soluble fatty acids of this soap was 0·25 and of the insoluble acids 0·7; m.p. of same, 47·5°; iodine value, 54·81.

Soft soap with Castor oil. The possibility of castor oil being used as a substitute for olive oil having been suggested, a specimen was made with that oil. The behaviour of its fatty acids would, however, under such substitution be easy of detection. Fatty acids of castor oil soap have the acetyl value 141·9, compared with 12·9 to 15·5 for those of olive oil soap. The η_D of the former is 1,4702 and of the latter 1,4613 to 1,4616.

Soft Soap, Neutral, for Dermatological Work. Vicario. (*J. Pharm. Chim.*, **29**, 428.) A perfectly neutral, white, unctuous soft soap may be obtained as follows. Pure KOH, 7 Gm., is dissolved in alcohol 95 per cent., 100 c.c.; then coconut fat, 43 Gm., is gradually added. When solution, with gentle heat, is complete, saponification will have been effected. The alcohol is then distilled off, and the residual 50 Gm. of soap is mixed with 50 Gm. of water. This sets, on cooling, to a soft soap of firm consistence, m.p. 25°C. Coconut oil is preferred on account of the greater lathering property of its soap; but lard, 50 Gm., and KOH, 11 Gm.; or sweet almond oil, or nut oil, 50 Gm., and KOH, 9 Gm., may be used in the same manner. This soap does not redden phenolpthalein, nor blacken calomel. It may be *superfatted* by the addition of 4 per cent. of olive oil, or 5 per cent. of lard. *Soap-ointments* may be prepared by incorporating more or less fatty matter or mineral oil in any desired quantity. The soap basis is compatible with all medications, even such as are readily decomposed by ordinary soft soap. If an alkaline soap is needed of definite keratolytic power this may be obtained by adding a known amount of alkali to the neutral soap.

Solubility of CaO in Water. G. T. Moody and L. T. Leyson. (*Trans. Chem. Soc.*, **93,** 1767.) Lime water prepared from white chalk lime was found to be stronger than that made from precipitated lime or that prepared from calcite. This is probably due to traces of alkalies, other than CaO, and also to SiO_2; the soluble silicates formed on ignition exerting a certain alkalinity. CaO precipitated with NaOH from $CaCl_2$ obstinately retains a trace of Cl, which may hinder the solubility of the CaO. Lime water is only fully saturated after prolonged contact with excess of CaO. Saturated lime water becomes supersaturated when its temperature is raised, and parts with its excess of CaO but slowly. Precipitated CaO, strongly ignited to drive off the traces of Cl, gives lime water of practically the same strength as that prepared from calcite. CaO obtained by precipitating $CaCO_3$ by means of Na_2CO_3 retains a trace of the alkali carbonate, and so gives an apparently stronger lime water. The following are the weights of water required to dissolve 1 Gm. of pure CaO from calcite at the given temperatures, 768·5 Gm. at 2°C.; 786·8 Gm. at 10°C.; 804·3 Gm. at 15°C.; 826·4 Gm. at 20°C.; 868·7 Gm. at 25°C.; 908·2 Gm. at 30°C.; 988·1 Gm. at 40°C.; 1083 Gm. at 50°C. 1179 Gm. at 60°C.; 1274·8 Gm. at 70°C.; and 1368·1 Gm. at 80°C.

Soured Milk and the Rationale of its Use. F. W. Gamble. (*Pharm. J.* [4], **28,** 253.) The bacteriology of soured milk and its method of preparation for medicinal use are described.

Spiritus aetheris nitrosi, Rapid Method of Preparing. D. B. Dott. (*Pharm. J.* [4], **28,** 429.) A spirit answering the official tests may be thus prepared. Mix 12 fl. oz. rectified spirit and 5 fl. oz. absolute alcohol with 158 grains sulphuric acid. Then dissolve ½ oz. sodium nitrite in 5½ fl. dr. water, and mix with the acid alcohol in stoppered bottle. After thorough cooling, filter through paper, and wash salt on filter with 6 fl. oz. rectified spirit. The only object in using a proportion of absolute alcohol is to keep down the specific gravity to B.P. requirement.

Stains from Medicinal Applications, Methods of Removing. (*Pharm. Zeit.*, **54,** 231.) *Iodine stains* are removed by moistening with AmOH or with $Na_2S_2O_3$. *Silver nitrate*, with KCN solution; or first with KI, then with $Na_2S_2O_3$. On the skin, they may be removed with the following solution: $HgCl_2$, 10; AmCl, 10; water, 80. *Chrysarobin*, with warm C_6H_6, $CHCl_3$ and C_2H_5OH. *Resorcin*, with dilute citric acid solution. *Picric acid*: Alkali sulphides, such as sulphurated potash solutions, are applied for a few minutes, then washed off with soap and water. If fresh, a paste of $MgCO_3$ rubbed with the finger will remove the stain. *Pyrogallol*: A 5 or 10 per cent. solution of $FeSO_4$ is applied and the bluish black colour is then removed with potassium binoxalate solution and well washed with water. This is only effective with fresh stains. *Coal tar colours:* Strong spirit of soap helps to remove these stains.

Sterilization in Pharmacy. R. R. Bennett and W. J. A. Woolcock. (*Pharm. J.* [4], **28,** 420.) The various methods of sterilizing instruments and preparations are fully described, and some of the necessary apparatus illustrated.

Stimulant Hair Lotion. (*J. Pharm. Chim.* [6], **28,** 326.) Acetic acid, 5; tincture of rosemary, 25; tincture of jaborandi, 25; tincture of cinchona, 25; rum, 50. Dilute with an equal quantity of water and apply with a soft brush.

Styrolated Lard. G. Pinchbeck. (*Pharm. J.* [4], **28,** 84.) The substitution of storax, 1 per cent., instead of benzoin for preserving lard for ointments is suggested, on the grounds that the trace of free benzoic acid in the official preparation may have an irritating action. The heat employed in the preparation of styrolated lard should not exceed 60°C. Its aroma is superior to that of the benzoated preparation.

Sublimation in Vacuo. R. Kempf. (*Apoth. Zeit.*, **23.**) Sublimation *in vacuo* would probably be found to yield many chemical substances employed in pharmacy in a crystalline condition of great purity. P_2O_5 thus treated forms very fine crystals between 180–250°C. HgS obtained by precipitation and purified with CS_2 gives a black crystalline mass at 400°C., which assumes a typical vermilion colour when triturated. Hydroquinone gives snow-white crystals; caffeine and theobromine are easily obtained directly from tea or cacao by sublimation *in vacuo*. Morphine sublimes unaltered at 220°C. Vanillin distils and partly sublimes, forming crystals 1 cm. long. Veronal and sulphonal are very easy to sublime.

Suppositories, Cold Process for Making. A. Schleimer (*Nat. Drugg.*, **39**, 54.) Cacao butter is cooled on ice, and grated with an ordinary kitchen grater, also previously chilled in the same manner. The grated material may be kept ready for use in a cool place in winter, or on ice in summer. The required quantity of this is weighed into a mortar, mixed with the prescribed quantity of active ingredients, and massed with about 5 per cent. of castor oil. The mass should be of the consistence of a soft pill mass. It is then rolled out on the pill machine to the required length, divided, and pressed into the mould. If necessary, the mass may be softened in the hand before moulding.

Suppositories, Manipulation of. G. Doerr. (*Suedd. Apoth. Zeit.*; *Schweiz. Woch. Chem. Pharm.*, **47**, 135.) *For solids*: Half the requisite weight of cacao butter is melted on the water-bath. The other half is rubbed through a wire sieve and intimately mixed with the powdered drug. The just melted portion is removed from the water-bath and the mixture gradually added with thorough stirring. The thin paste thus obtained is poured at once into the previously soaped moulds. The suppositories will set in 3 or 4 minutes. By this method, settling of the suspended powder is avoided. *For liquids*; The liquid is rubbed down in a cold mortar with a little of the cacao butter, previously melted. As this cools it forms an emulsion with the liquid; this is then thinned down with the rest of the cacao butter and stirred until it is of a creamy just pourable consistence, when it is moulded.

Syrup of Cinchona, French Codex Test for the Identity of. F. L. Ydrac. (*Bull Sci. pharm.*, **16**, 328.) The following test for syrup of cinchona fails to give the characteristic thalleioquin reaction when performed as directed. "To 10 c.c. of the syrup add 10 drops of AmOH and 20 c.c. of rectified Et_2O; shake out, and separate the Et_2O solution. To this add successively 2 drops of HCl, 5 drops of Br solution, and 10 drops of AmOH. An emerald green colour, due to the presence of quinine, should be obtained." The test should be modified thus:—The Et_2O should be evaporated to dryness; the dry residue redissolved in water and a drop or two of HCl. Then the test should be continued as directed in the official text.

Syrup of Glycerophosphates, Compound. J. Humphrey and F. Goldby. (*Pharm. J.* [4], **27**, 512.) The following improved formula has been constructed, the iron salt being employed in the form of a solution. *Liquor ferri glycerophosphatis B.P. Codex.* Iron and ammonium citrate, 4·60 ; citric acid, 6·85 ; strong solution of ammonia, 6·25 ; glycerophosphoric acid (20 per cent.), 21; distilled water, sufficient to produce 100. Dissolve the iron and ammonium citrate and the citric acid in 50 of distilled water, and add the strong solution of ammonia ; then add the glycerophosphoric acid, warm the liquid until it assumes an olive-green colour, and make up to 100 by volume with distilled water.

Syrupus glycerophosphatum compositus, B.P. Codex., 1908. Calcium glycerophosphate, 2 ; potassium glycerophosphate, 1 ; sodium glycerophosphate, 1 ; magnesium glycerophosphate, 1 ; solution of iron glycerophosphate, 10 ; glycerophosphoric acid (20 per cent.), 5 ; caffeine, 0·50 ; strychnine, 0·024 ; glycerin, 20 ; refined sugar, 40 ; tincture of cudbear, 3 ; stronger chloroform water (1 in 200), sufficient to produce 100. Triturate the calcium, potassium, sodium, and magnesium glycerophosphates with the glycerin, mixed with 25 of stronger chloroform water, and add the solution of iron glycerophosphate ; then dissolve the caffeine and strychnine in the glycerophosphoric acid, by the aid of gentle heat if necessary, mix the two solutions, dissolve the sugar in the mixed liquids without the aid of heat, add the tincture of cudbear, make up to 100 by volume with stronger chloroform water, and strain or filter if necessary.

Syrup of Hypophosphites and Syrup of Calcium Lactophosphate, Progressive Inversion of the Sugar of, by Keeping. H. W. Jones. (*Proc. Amer. Pharm. Assoc.*, **56,** 869.) The author's investigations confirm those of Haussmann and of Woltersdorf and Richtmann, and show that considerable progressive inversion of cane sugar occurs under ordinary conditions in these syrups. In syrup of hypophosphites US.P. the rate of inversion is about 4 per cent. of the sugar present, per month ; in syrup of calcium lactophosphate about 15 per cent. per month. The use of organic acids in place of inorganic acids does not prevent this.

Syrup of Orange, Extemporaneous. P. H. Vtech. (*Proc. Amer. Pharm. Assoc.*, **56,** 950.) Oil of sweet orange, 6 ; citric acid, 5 ; magnesium carbonate, 4 ; alcohol 94 per cent., water, of each q.s. ; simple syrup to make 1,000. Mix alcohol 40 with water 20. Rub down the oil with the magnesia, then gradually add the diluted alcohol. Filter and add enough alcohol and water in the same proportion to make filtrate measure 60. Dissolve the acid in this and add sufficient syrup to make 1,000. Where there is little demand for the syrup the alcoholic solution of the oil prepared as above may be kept. This is to be used in the proportion of 1 volume to 15 of simple syrup.

Syrup of Potassium Sulpho-creosotate (Sulphosote). (*Schweiz. Woch. Chem. Pharm.*, **48,** 187.) (1) Potassium sulpho-creosotate, 15; distilled water, 35; simple syrup, 45; tincture of gentian, 5. (2) Potassium sulpho-creosotate, 15; distilled water, 35; liquid extract of gentian, 5; tincture of caramel, 0·5; simple syrup, to make 150 by weight. (3) Potassium sulpho-creosotate, potassium sulpho-guaiacolate, of each 50; distilled water, 350; sugar, 450; liquid extract of immature oranges, 50; tincture of orange, 50; all by weight.

Tablets or Powders for Purifying Drinking Water. J. Laurent. (*J. Pharm. Chim.* [6], **28,** 392.) A mixture of powdered potassium permanganate, 0·03 Gm., and powdered alum, 0·06, is sufficient to sterilize a litre of ordinary water in 5 minutes; excess of permanganate is then removed by adding a mixture of powdered sodium thiosulphate, 0·03 Gm.; powdered dry sodium carbonate, 0·06 Gm. After simple filtration through a pad of absorbent cotton a perfectly sterile drinking water free from all taste is obtained. The above quantities may be doubled or trebled for very bad water; sufficient of the permanganate mixture should be added to give a rose tint persistent for 5 minutes. For convenience the above mixtures may be compressed into tablets, using a permanganate-alum tablet of 0·09 Gm. for each litre of water, and a corresponding thiosulphate-sodium carbonate tablet to remove the excess. The mixed powders keep well.

Tar Bath with Oleum rusci. K. Taege. (*Apoth. Zeit.*, **24,** 292; *Muench. Med. Woch.*) The following formula gives a bath in which the tar oil is evenly suspended; the liquid does not leave spots on the skin, nor on the bath itself, even after standing for a day. Oil of birch tar, 150 Gm.; caustic potash solution, sp. gr. 1·130, 90 Gm.; shake together and add methylated spirit, 500 c.c. To be poured with constant stirring, in a thin stream, into a bathful of water. For smaller quantities, one or two tablespoonfuls may be added to a washhand basin full of water. (See also *Y.B.*, **1907**, 224.)

Thyme, Syrup of, Simple. — Wippern. (*Apoth. Zeit.*, **24**, 25.) Thyme herb (*Thymus vulgaris*) crushed, 900 Gm., is macerated with a mixture of alcohol 90 per cent., 700 Gm., and glycerin, 200 Gm., in a closed vessel for several hours; water, 3 kilos, is then added, and the mixture macerated, with occasional agitation, for 4 to 5 days. It is then strained, pressed, and the liquid filtered. The weight of filtrate should be about 3 kilos. Sufficient sugar to make the weight 6,300 Gm. is then added and dissolved in the cold or with gentle heat. Finally, 9 drops of thyme oil, rubbed down with 20 Gm. of sugar, is added to the syrup. Thyme syrup is an excellent remedy for whooping cough and for catarrh.

Tinctura haemostyptica. (*Pharm. Zeit.*, **54**, 444.) Crushed ergot, 10 Gm., is boiled with alcohol, 20 Gm., dilute H_2SO_4, 12 Gm., and water, 500 Gm., until the weight is 200 Gm. $CaCO_3$, 2 Gm., is then added; when CO_2 has been driven off the liquid is expressed and evaporated to 70 Gm.; when cold alcohol 69 per cent., 30 Gm., and cassia oil, 3 drops, are added. After standing for a few days the mixture is filtered.

Tooth Paste, Antiseptic. (*Pharm. Zeit.*, **54**, 376.) Precipitated chalk, 30 Gm.; magnesium carbonate, 5 Gm.; powdered hard soap, 15 Gm.; carmine, 7·5 Mgm.; peppermint oil, 2 Gm.; tincture of myrrh, 5 Gm.; saccharin, thymol, of each 1 Cgm.; olive oil, 5 Gm.; acetic ether, 1·5 Gm., to make a paste.

Tubercle Bacilli, Simple Method of Separating. C. Mongour. (*L'Union pharm.*, **49**, 542.) The process, which has been named the chorisimetric method *per ascensum*, gives good results. Ten c.c. of sputum is mixed with 100 c.c. of distilled water, and 10 drops of NaOH solution (sp. gr. 1·332) in a porcelain capsule, and heated with constant stirring, until the liquid is homogeneous and ceases to be stringy. The cold liquid is then transferred to a separator, and shaken out with Et_2O after adding an excess of acetic acid. As the Et_2O separates it carries up the bacilli in the coagulum which forms at the zone of contact. This coagulum is then redissolved in NaOH solution, and again shaken up; in about 15 minutes a pellicle will form at the zone of contact, and will contain any bacilli present. The method is applicable also to the detection of tubercle bacilli in fæces.

Unguentum altheae. A. D. Watson. (*Pharm. J.* [4], **27,** 432.) Marsh-mallow leaves, 2, are boiled with water, 40, for 45 minutes, strained, pressed and filtered. The filtrate is evaporated to a thin extract and mixed while warm with lard, 4. This ointment has a tendency to go mouldy.

Unguentum Aquae Rosae. V. Schmidt. (*Amer. Drugg.*, **54,** 229.) White wax, spermaceti, of each 5½ troy ounces; pure white Russian mineral oil, 30 troy oz.; distilled water, 12 fl. oz.; borax, 2½ dr.; otto of rose, 30 drops. Melt the wax and spermaceti in a capacious tared dish, add the oil and heat until clear. Dissolve the borax in the water heated to 150°F. Let the fats cool to about the same temperature, then add the borax solution in one lot. Stir until set, and when nearly cold add the otto. The white, creamy ointment keeps well and is cheap.

Unguentum capsici compositum. (*Canad. P.J.*, **42,** 583.) The following formula is suggested for inclusion in the third edition of the Canadian Formulary. Capsicum (in powder), 1 dr; camphor (in powder), 2 dr.; oil of turpentine, 4 dr.; oil of cajuput, 2 dr.; oil of cloves, 1 dr.; oil of wintergreen, 1 dr.; oil of croton, ½ dr.; yellow beeswax, ½ oz.; yellow petrolatum, 8 oz. Melt the petrolatum and the wax together, add the capsicum and digest at a moderate heat for 2 hours. Remove from heat and allow to cool slightly and add the camphor. Stir till dissolved, strain, add the oils and stir until the product thickens.

Unguentum conii, Improved Formula for. G. Pinchbeck. (*Pharm. J.* [4], **28,** 85.) Ext. conii liq., 1 per cent. by weight, 4; Adeps lanea anhyd., 13; paraffin molle, 26; thymol, 0·16 Reduce the liquid extract by evaporation on a water-bath to 1 by weight, and incorporate the anhydrous wool-fat, and the soft paraffin, in which the thymol has been previously dissolved by the aid of heat. The finished preparation will contain 0·1 per cent. of the alkaloids of conium fruit.

Unguentum rubrum balsamicum; Spykerbalsam. White wax, 25; sesame oil, Venice turpentine, of each 36, are melted together. Red sandalwood in powder, 3, is added, digested for 30 minutes and strained. Peruvian balsam, 3, is then added to the partly cold mass.

Vienna Infant's Species. (*Pharm. Zeit.*, **53,** 808.) Marshmallow root, 100; liquorice root, 20; triticum rhizome, 40; poppy heads, 5. Mix.

Wunder's Gout-tea Species. (*Pharm. Zeit.*, **53,** 808.) Senna leaves, juniper berries, dulcamara stems, guaiacum wood, liquorice root, of each 8; star anise, 1. Mix.

RESEARCH LIST, 1909

The following subjects are suggested for investigation, and the Executive Committee hopes that the members of the B.P.C. will undertake to work on one or more of these questions. New subjects have been added to the list to replace those worked out. The Hon. Secretaries wish to direct attention to the fact that a special fund exists to defray expenses connected with research work. The Executive Committee will be glad to receive applications from members for grants from this fund.

Plant Analysis.

1. *Aconite Root.* A series of experiments to determine the alkaloidal content of parent and daughter root at various periods of growth is required.

2. *Aletris farinosa.* The bitter principle of the rhizome requires investigation. (See *Pharm. Journal* [3], **17**, 122, 123.)

3. *Aloin.* A research is needed on the proportion of aloin and non-resinous constituents in the different varieties of aloes.

4. *Asafetida.* Determination of the volatile oil in various samples and grades of the drug should be made.

5. *Calabar Bean.* A research is needed with the object of ascertaining the relative proportion of the different bases present in this drug.

6. *Colchicum.* A comparison of the published processes for the assay of colchicum and its preparations.

7. *Damiana* is reported to contain a bitter substance, resins, and volatile oil. The liquid extract of the leaves being extensively used, a thorough systematic examination of the drug is desirable.

8. *Euphorbia pilulifera.* Required, a report upon the chemistry of this drug.

9. *Fennel.* Fruits exhausted, or partially so, of essential oil, and artificially coloured, are met with in commerce. If used in making compound liquorice powder, how can they be detected ?

10. *Gelsemium Root.* Required, an investigation into the relative proportion of gelsemine and gelseminine.

11. *Hemidesmus indicus.* The extraction and examination of the aromatic body.

12. *Hops.* How can the bitter principle best be isolated and quantitatively determined ?

13. *Lobelia inflata.* The chemistry of this drug requires further investigation.

14. *Male Fern.* The chemistry and pharmacy of this drug both require investigation.

15. *Podophyllum emodi* is official in the B.P. Addendum as a source of resin for use in India and the colonies. Should it not also be included in the next edition of the ordinary British Pharmacopœia ?

16. *Senega Root.* The chemistry of this drug requires examination.

17. *Strophanthus.* An examination of the published methods of separating the different active principles obtained from the seeds is needed with the view of recommending a standard process. (See *Year-Book*, **1898,** 54, 162 ; **1899,** 59 ; **1901,** 167 ; also *Pharm. Journal* [4], **6,** 385, 506.) The seeds as met with in commerce are frequently mixed. Further information is desirable as to the active principles they severally contain.

18. *Veratrine.* Should a pure veratrine be included in the British Pharmacopœia rather than the mixture of alkaloids now official ? If so, suggest a process for its purification.

19. Chemical investigation of the following drugs is required :—*Cereus grandiflorus*, *Citrullus colocynthis*, *Cassia fistula*, *Serenoa serrulata* (saw palmetto), *Arnica montana*, *Monsonia ovata*, *Monsonia biflora*, *Thuja occidentalis*, *Ranunculus ficaria*, *Tanacetum vulgare*, etc. ; *Senecio Jacobœa* and *Achillea millefolium.*

CHEMISTRY.

20. *Ammonii Phosphas.* A rapid method for the assay of this salt.

21. *Apomorphine.* Do solutions of salts of this alkaloid retain their potency after colouration has taken place ?

22. *Calx sulphurata.* An investigation on the processes of manufacture and purity of commercial samples is needed.

23. *Camphor, Synthetic.* This is coming into use in pharmacy, and its characters, as contrasted with those of natural camphor, should be clearly defined.

24. *Glycerin.* Required, a good method for determining this substance in tinctures, liquid extracts, etc.

25. *Indicators.* Some artificial colours are affected only by mineral acids, and it is thought that one or other of these might be utilized for the determination of the strength of preparations like Liquor Plumbi Subacetatis, etc.

26. *Oils.* Required, a comparative examination of the value of Hübl's, Hanus', and other solutions for testing fixed oils, fats etc.

27. *Solids.* A method is required for the accurate determination of the amount of solids in spirituous preparations containing glycerin.

28. *Solvents.* Experiments are needed with a view to extending the use of solvents such as acetone, carbon tetrachloride, petroleum ether, etc., in pharmacy.

29. *Test Solutions.* Some of the official test solutions do not keep well. Experiments are needed with the object of devising means of preserving these without interfering with their usefulness.

PHARMACOPEDY AND PHARMACY.

30. *Acacia.* An examination of commercial samples of the powdered gum is required.

31. *Aromatic Waters.* A comparison of the quality and keeping properties of aromatic waters prepared by distillation of the drug with those of waters made by solution of the oil.

32. *Bottles.* The question of the colour and style of bottles best fitted for the storage of chemicals and galenicals might form a valuable subject of inquiry.

33. *Cannabis indica.* Required, standard strengths for the official preparations of this drug and processes for their determination. Experiments are also needed to determine the difference in yield of resin, cannabin, and cannabinol between the Guaza of Bombay, the Ganjah of Calcutta, and other commercial varieties of cannabis. African Guaza is now being offered in commerce—a comparison of its properties with those of Cannabis Indica would be of value.

34. *Camphor.* Processes are required for the estimation of the camphor in some of the official liniments, and for the detection of mineral or other foreign oil in camphor liniment.

35. *Cod-liver Oil.* It is suggested that an examination of commercial samples of cod-liver oil and other emulsions may be

of service. Can the usual methods for the determination of the fat in milk be utilized for the purpose?

36. *Emplastra.* An examination of commercial samples of official plasters would yield useful results.

37. *Ergot.* Required, a method of determining the relative activity of the official preparations of ergot.

38. *Formaldehyde.* The examination of commercial samples of the solution.

39. *Galenical Preparations.* Should the forms for galenical preparation of drugs be so arranged as to aim at a general ratio of strength between the drug and the preparation?

40. *Gum Resins.* The value of the saponification numbers in determining the identity and purity of the resins of gum resins.

41. *Ipecacuanha, Liquid Extract of.* Experiments are needed to determine whether the use of lime can be dispensed with in making this preparation.

42. *Jaborandi.* The leaves as imported are much mixed with stalks. Should the leaves be completely separated from the stalks for the making of official preparations? What is the ether-soluble alkaloidal strength of old leaves, young leaves, and stalks? The tinctures of this drug met with in commerce are likely to vary considerably in alkaloidal content. A report on commercial samples would probably prove instructive.

43. *Japanese Chillies.* The determination of the botanical source.

44. *Japanese Ginger.* Determination of the botanical source and comparison of the structure with that of official ginger.

45. *Morphine.* Can the process described in the *Year-Book of Pharmacy*, **1907**, p. 107, for the determination of morphine be applied to opium and its preparations?

46. *Ointments.* An improved basis is wanted to replace Ungt. Paraffin.,B.P., the physical characters of which are unsatisfactory.

47. *Oxydase.* The action of this class and other ferments in inducing changes in galenical preparations, such as liquid extracts, etc.

48. *Oxymel scillae.* What change, if any, takes place when heat is used in making this preparation?

49. *Powdered Drugs.* A systematic and extended examination of the powdered drugs of English commerce.

50. *Pills, etc.* An investigation is needed on the strength and quality of commercial samples of pills, capsules, compressed tablets, etc., met with in pharmacy.

51. *Quillaia Bark.* Experiments to determine the best menstruum for exhausting this bark for the purpose of making emulsifying agents, and a comparison of the genuine bark with the thin bark at present in commerce.

52. *Syrups.* Improved methods are required for the determination of the strength and purity of some of the official syrups.

53. *Tannin.* Comparative examination of the tannic acid at present in commerce (solubility in various solvents, moisture, etc.).

54. *Witch Hazel, Distilled Extract of.* The imported article varies much in character and properties. Required, an investigation upon this. (See *Pharm. Journal* [3], **13**, 524.)

TRANSACTIONS

OF THE

British Pharmaceutical Conference

AT THE

FORTY-SIXTH ANNUAL MEETING

IN

NEWCASTLE.

1909

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British Pharmaceutical Conference.

CONSTITUTION.

Art. I.—This Association shall be called The British Pharmaceutical Conference, and its objects shall be the following :—

1. To hold an annual Conference of those engaged in the practice, or interested in the advancement, of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical Science.
2. To determine what questions in Pharmaceutical Science require investigation, and when practicable, to allot them to individuals or committees to report thereon.
3. To maintain uncompromisingly the principle of purity in Medicine.
4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference.

Art. II.—Membership in the Conference shall not be considered as conferring any guarantee of professional competency.

RULES.

1. Any person desiring to become a member of the Conference shall be nominated in writing by a member, and be balloted for at a general meeting of the members, two-thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the candidate by a unanimous vote.

2. The minimum subscription shall be 7*s.* 6*d.* annually, which shall be due in advance upon July 1.

3. Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee. Members may be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, provided that fourteen days' notice of such intention of expulsion has been sent by the Secretaries to each member of the Conference.

4. Every association established for the advancement of Pharmacy shall, during its recognition by the Conference, be entitled to send delegates to the annual meeting.

5. The Officers of the Conference shall be a President, a number of Vice-presidents not exceeding six, by election, the past Presidents (who shall be Vice-presidents), a Treasurer, two General Secretaries, one local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of the Executive Committee to retire annually by ballot, the remainder being eligible for re-election. They shall be elected at each annual meeting, by ballot of those present.

6. At each Conference it shall be determined at what place and time to hold that of the next year.

7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.

8. The Executive Committee shall present a report of proceedings annually.

9. These rules shall not be altered except at an annual meeting of the members.

10. Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become. All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting.

⁂ *Authors are specially requested to send the titles of their Papers to The Hon. Gen. Secs. Brit. Pharm. Conf., 17, Bloomsbury Square, London, W.C., two or three weeks before the Annual Meeting. The subjects will then be extensively advertised, and thus full interest will be secured.*

FORM OF NOMINATION.

I Nominate

(Name) ……………………………………………………

(Address) ……………………………………………………

as a Member of the British Pharmaceutical Conference.

…………………………………… *Member*

Date ……………………………………

This or any similar form must be filled up legibly, and forwarded to *The Asst. Secretary Brit. Pharm. Conf.*, 17, Bloomsbury Square, London, W.C., who will obtain the necessary signature to the paper.

Pupils and Assistants, as well as Principals, are invited to become members.

PROGRAMME OF THE PROCEEDINGS
OF THE
BRITISH PHARMACEUTICAL CONFERENCE
AT THE
FORTY-SIXTH ANNUAL MEETING, NEWCASTLE, 1909.

OFFICERS.

President. J. F. TOCHER, B.Sc., F.I.C., Peterhead.

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(Who have filled the office of President.)

JOHN ATTFIELD, Ph.D., F.R.S., F.I.C., F.C.S., Watford.
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Assistant Honorary Local Secretary.
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Other Members of the Executive Committee.

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H. FINNEMORE, London.
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Editor of the Year-Book. J. O. BRAITHWAITE.

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MARTIN, Dr. W.
McBRYDE, A. H.
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POOL, R.
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REID, D.
RIDDLE, W. R.
RIDLEY, C.
RIDLEY, T.
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ROWELL, Dr. R. H.
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WEDDELL, G.
WESTON, M. P.
WHITEHEAD, G.
WILKINSON, J. L.
WILLIAMSON, B.
WILLIAMSON, J. B.
WILLIAMSON, L.
WRAY, T.
WRIGHT, R.

THE SITTINGS OF THE CONFERENCE WERE HELD IN
ARMSTRONG COLLEGE, NEWCASTLE,
ON TUESDAY AND WEDNESDAY, JULY 27 AND 28, 1909.

TUESDAY, JULY 27.

The CONFERENCE met at 9.30 a.m., adjourning at 1.30 p.m.

Order of Business.

Address of Welcome.
President's Address.
Report of the Executive Committee.
Financial Statement.
Report of the Treasurer of the "Bell and Hills" Library Fund.
Reading of Papers, and Discussion thereon.

PAPERS.

1. *Some Experiences in the Testing of Drugs by Bio-Chemical Methods, with Special Reference to Digitalis, Squill, and Strophanthus*, by William Martin, M.A., M.D.
2. *The Estimation of Extractive and Glycerin in Spirituous Galenicals* by W. A. H. Naylor, F.I.C., F.C.S., and E. J. Chappell.
3. *The Constituents of Cimicifuga Racemosa*, Preliminary Abstract by Horace Finnemore, B.Sc., F.I.C.
4. *Commercial Emulsions*, by E. W. Pollard, B.Sc.

WEDNESDAY, JULY 28.

The CONFERENCE met at 9.30 a.m., adjourning at 1.30 p.m.

Order of Business.

Reception of Delegates.

Discussion on "Should the Dispensing of Medical Prescriptions be exclusively confined to Pharmacists," opened by the President.

PAPERS.

5. *Some Problems of the Poison Schedule*, by H. W. Gadd, F.C.S.
6. *Antimonium Sulphuratum*, by F. H. Alcock.
7. *The Determination of Antimony in its Sulphide Preparations*, by D. Lloyd Howard and J. B. P. Harrison, F.I.C.
8. *Concerning the Quantitative Determination of Free Salicylic Acid in Bismuth Salicylate*, by J. B. P. Harrison, F.I.C.
9. *Ung. Paraffini*, by J. H. Franklin.
10. *Note on Fluid Extract of Cascara Sagrada*, by C. Symes, Ph.D.
11. *Cacao Butter*, by W. B. Cowie and B. M. Brander.
12. *Refractometric Examination of Galenical Preparations*, by W. B. Cowie and T. O. Broadbent.

13. *The Chemistry of Euphorbia Pilulifera.* By J. S. Hill.
14. *Note on the Separation of Strychnine from Brucine*, by G. Pinchbeck, F.C.S.
15. *The Use of Alcohol in Pharmacy*, by D. B. Dott, F.R.S.E.
16. *P-Hydroxyphenylethylamine, an Active Principle of Ergot, Soluble in Water*, by G. Barger, D.Sc.
17. *On Malt Extract with Cod-liver Oil*, by E. F. Harrison, B.Sc. (Lond.), F.I.C.
18. *The Comparative Examination of the Halogen Absorption of Oils by the Methods of Hübl, Wijs, Hanus, and McIlheney*, by J. S. Remington and H. Lancaster.
19. *Note on the Determination of Gingerol in Ginger*, by H. Garnett and J. Grier.

GENERAL BUSINESS.

Vote of thanks to the Authorities of Armstrong College.
Presentation of Books from the "Bell and Hills" Fund.
Vote of thanks to Mr. Edmund White, the retiring Hon. Secretary.
Place of Meeting, 1910.
Election of Officers for 1909–10.

BRITISH PHARMACEUTICAL CONFERENCE,

LIST OF VISITORS, ANNUAL MEETING, NEWCASTLE.

Aberdeen—Craig, A.; Giles, Wm., and Mrs. Giles; Hay W. F., and Miss Hay; Kay, Jas. P.; Paterson, Jas.

Alnwick—Newbigin, L.

Bedlington—Foggan, Geo., and Mrs. Foggan.

Belfast—Nicholl, J. W.

Birmingham—Alcock, F. H., and Mrs. Alcock; Murdoch, J. G.

Blyth—Cormack, G.

Bolton—Knott, H.

Bradford—Hanson, A.; Mackay, C., and Mrs. Mackay; Silson, R. W., and Mrs. and Miss Silson.

Bury—Crompton, H.

Cambridge—Peck, E. Saville, and Mrs. Peck; Peck, R. B. Saville.

Coldstream—Elliot, W. M.

Dowlais—Rees, R. P.

Dublin—Smith, John, and Mrs. Smith; Wells, W. F., and Mrs. and Miss Wells.

Edinburgh—Boa, Peter; Coull, Dr. G., and Mrs. Coull; Cowie, W. B.; Cumming, Dr. John; Duncan, Wm.; Hill, J. Rutherford; Mair, Wm.; Tocher, J. W.

Elland—Brier, Ernest.

Exeter—Gadd, H. Wippell.

Forfar—Macfarlane, M.

Glasgow—Christie, R. L.; Currie, Wm. L., and Misses Currie; Sutherland, J. W.; Tocher, Robt.

Haddington—Wilson, W. P.

Hanley—Jones, Edmund.

Harrogate—Taylor, Sol.

Hartlepool (West)—Clarkson, Thos., and Miss Clarkson.

Helensburgh—McMurray, Peter B.

Hexham—Riddle, W. R.; Gibson, J. P.

Hitchin—Ransom, F., and Mrs. Ransom.

Keith—Smith, W. Crampton.

Kemnay—Weir, Alex. S.

Kilmarnock—Merson, G. F., and Mrs. Merson.

Leeds—Beacock, J. H.; Branson, F. W., and Mrs. Branson; Sargeant, F. Pilkington.

Liverpool—Evans, Sir Edward; Evans, John P.; Evans, W. P.; Symes, Dr. Charles.

London—Ashton, F. W.; Bourdas, I., and Miss Bourdas; Bremridge, R.; Clarke, Frank, and Mrs. Clarke; Dixon, C. H.; Finnemore, H., and Mrs. Finnemore; Goodall, F. C.; Hearn, John; Howard, D. Lloyd; Howie, W. L.; Jennings, J. A., and Mrs. Jennings; Layman, C. N.; Little, Eliz. L.; Martindale, Dr. W. H.; Naylor, W. A H.; Parsons, W.; Pentney, J. C., and Mrs. Pentney; Procter, H. R., and Mrs. Procter; Purse, A. D.; Tyrer, Thos.; Want, W. P., and Mrs. Want; White, Edmund, and Mrs. White; Woolley, S. W.

Manchester—Cleworth, John; Franklin, J. H.; Hughes, W. Griffiths, and Miss A. C. Hughes; Johnstone, C. A.; Little, the Misses; Napier, A.

Morpeth—Schofield, N., Mrs. and Miss Schofield; Simpson, Thos., and Mrs. Simpson.

Newcastle—Airey, H. Morris; Atkins, W.; Bedson, Professor; Bolam, John; Bowser, Thos.; Bryson, R.; Bullerwell, J. W.; Clague, C. Ernest; Clague, T. Maltby, and Mrs. Clague; Clague, W. Douglas; Corder, Percy; Crake, J. W.; Crawhall, T. C.; Dakers, John I.; Dean, E.; Doig, J. A.; Dunstan, S.; Farquharson, Dr. J. D.; Forster, J. Hall, and Mrs. Forster; Hollingsworth, A.; Gilderdale, F., and Mrs. Gilderdale; Ismay, A.; Ismay, R.; Ismay, S.; Kerse, W., and Mrs. Kerse; Layne, Chas. E.; Malcolm, John, and Miss Malcolm; Martin, N. H., and Miss Martin; Martin, Dr. W., and Mrs. Martin; McClumpha, R., and Mrs. McClumpha; Meritt, Walter T.; Noble, H. W., and Mrs. Noble; Park, F., and Mrs. Park; Pescod, W., and Miss Pescod; Pool, R.; Russell, C. I., and Mrs. Russell; Shand, R.; Silversides, R. B. G.; Simpson, J. F.; Stroud, Professor; Stuart, C. E., and Mrs. Stuart; Turnbull, Alex.; Usher, J. F.; Weddell, Geo., and Mrs. and Misses Weddell; Williamson, L., and Miss Williamson; Wishart, Dr. John; Wright, R.; Wyatt, Wm., and Mrs. Wyatt.

Oakengates—Dunn, W. R.

Oxford—Burbank, Miss A.; Clayton, C.; Dolbear, John; Dolbear, Percy.

Peterhead—Tocher, J. F., and Mrs. and Miss Tocher.

Ryde—Pollard, E. W.

Shields (North)—Buckley, W., and the Misses Buckley; Corder, Walter S., and Mrs. Corder; Stonier, T. S.

Shields (South)—Alexander, T. B.; Reid, A. D., and Mrs. Reid; Williamson, B., and Mrs. Williamson.

Southsea—Barlow, T. O.

Sunderland—Harrison, J.; Hodgson, C.; Pinkney, Major, and Mrs. Pinkney; Purse, A. D.; Ranken, C.

Tynemouth—Bell, W. J.

Turriff—Cruickshank, G. M.

Walker-on-Tyne—Brown, J.

Whitley Bay—Pattinson, H.

Worcester—Twinberrow, John.

GENERAL MEETING.

Tuesday, July 27.

The Sessions of Conference opened in Armstrong College shortly after 9.30 on Tuesday morning, July 27. The PRESIDENT (Mr. J. F. Tocher, B.Sc., F.I.C.) took the chair, and he was supported by Mr. Weddell (Chairman of the Local Committee), Mr. T. M. Clague (Hon. Secretary of the Local Committee), Mr. E. S. Peck and Mr. E. White (Hon. Secretaries of the Conference), Mr. John Smith (President of the Pharmaceutical Society of Ireland), Sir Edward Evans, Mr. D. Lloyd Howard, Mr. W. A. H. Naylor, Dr. Symes, Mr. N. H. Martin, and Mr. F. H. Alcock.

ADDRESS OF WELCOME.

Mr. G. WEDDELL, in welcoming the members to the Conference, said some weeks ago, when an eminent statesman was receiving a conference of Press representatives from all parts of King Edward VII.'s dominions at home and across the seas, he gave them a greeting in a few significant words which not only thrilled the hearts of those who heard them, but also the hearts of millions who read them in all parts of the world. Lord Rosebery's greeting was "Welcome Home," and in the name of the local pharmacists of Newcastle-on-Tyne, of Sunderland, and surrounding district, he offered them a warm welcome to the home where forty-six years ago they first saw the light. At that first meeting there were three pharmacists—Brady, Mawson and Proctor—who were still represented in Newcastle. No one could be great in pharmacy without being greater than pharmacy. It was a calling that demanded keen, strenuous attention to details, and yet it required an amount of scientific knowledge which he was sorry to say did not always find its highest fulfilment in the calling. Brady was a scientific man in the highest sense of the word; Mawson was a strong public-spirited man, who died in the execution of his duty while Sheriff of Newcastle; Proctor was a pharmacist, but his pharmacy had led pharmacists for forty years travelling through the wilderness. To-day those three names were still prominent in Newcastle; the firms which they founded were carried on by their immediate successors and descendants under names which were well known to all. The fact that those three names still existed and occupied a certain prominence in Newcastle-on-Tyne was an evidence that the purely personal search was not enough to ensure permanence. Broad ideas and large hearts were the things that prevailed and remained. The man who sought his own, and nothing more than his own, and paid no attention to public spirit, was bound to become smaller in mind and be forgotten. In welcoming the Conference, he wished to speak to their local friends who did not attend the Conference. By mixing in the public life of the calling in which they were engaged they became not only wiser but broader-minded in other directions. He strongly urged upon the local pharmacists who were not members of the Conference, but who only joined out of courtesy to their guests, to become permanent members, and so enlarge the scope of the Conference and make it still more useful. It afforded him great pleasure to welcome them home, and he assured them it was with a very warm heart and a proud name. He spoke in the name of the pharmacists, not only of Newcastle-on-Tyne, but for fifty miles round, and he hoped that their stay would be enjoyable, that their deliberations would be fruitful, and that they would make many permanent friends where now they were only acquaintances.

The President, in thanking Mr. Weddell for the cordial welcome he had extended to the members of the Conference, said he was sure that the members of the Local Committee had been working hard to make the Conference a success—just as great a success as it was in the beginning and as it was twenty years ago. There was every reason why the Conference should be a great success. In the first place they had Mr. Weddell, the purposeful and genial Chairman of the Local Association, and they had Mr. Clague, the resourceful and twice Local Secretary of the Conference. Besides, they had in Newcastle and round about a group of pharmacists who had no superiors in skill or in attainments or in success; he had only to mention the name of Mr. N. H. Martin to confirm that statement. There were also many industries connected with Newcastle, and they had also the historic interest of Newcastle. They might imagine what would have been the delight and amazement of Sir Humphry Davy, who over one hundred years ago discovered sodium, had he been able to see the production of sodium on the banks of the Tyne to-day, not only in grains or ounces and pounds, but by tons. The production of that metal, shipbuilding, coal-mining, and the wide agricultural activities all point to a purposeful community. In conclusion, in one word, he wished to thank Mr. Weddell for his exceedingly kind welcome.

APOLOGIES FOR ABSENCE.

Mr. PECK read letters of apology for absence from the President of the Pharmaceutical Society, Dr. John Attfield, Messrs. R. Wright, J. C. Umney, G. C. Druce, G. Lunan, J. P. Gilmour, E. F. Harrison, J. S. Hills, G. W. Worfolk, David Hooper, and Dr. Power.

Dr. Attfield, in his letter, said :—

> I gladly comply with your invitation to write a founder's letter to the British Pharmaceutical Conference, assembling shortly at the place of its birth. Forty-six years ago I worked with all my heart and strength to aid Richard Reynolds, Henry B. Brady, and Henry Deane to establish the British Pharmaceutical Conference. My heart yearns to be at Newcastle-on-Tyne at the forthcoming meeting to receive the great pleasures my brother members would yield and to give what little help I might afford. But, imprisoned by neuritis and insomnia, my resulting mental and physical weakness absolutely confine me to my house and garden. I earnestly wish that this third gathering of the body in Newcastle may prove to the President, Mr. Tocher, and to every other officer and member to be an unqualified success. Did followers of pharmacy realise the great fundamental advantages attending membership of the Conference, the list of members would be larger and attendance at the annual meeting be greater.

On the motion of Mr. N. H. MARTIN, the following telegram was sent to Dr. Attfield at Watford : "The Pharmaceutical Conference in open meeting heard your letter with great pleasure, and sends you—one of its two surviving founders—hearty congratulations and hopes for your better health and greater happiness.—TOCHER, President."

The following telegram was received in reply :—"Earnest thanks to members and President for their kind congratulations and greetings."

PRESIDENTIAL ADDRESS.

SOME PROBLEMS OF INTEREST TO PHARMACISTS TO-DAY

(1) INTRODUCTORY.

I cannot forget that it was here in Newcastle-on-Tyne that for the first time British pharmacists met together as a voluntary assembly to discuss problems of interest to the craft. The institution of the British Pharmaceutical Conference as an organization for the encouragement of pharmaceutical research in 1863, five years prior to the passing of the Pharmacy Act which gave pharmacists a legal status, was an event of the greatest importance to pharmacists. Its avowed object of holding meetings in different parts of the country for the purpose of affording a periodical opportunity for pharmacists in the provinces meeting one another and discussing subjects of importance to us in our private and public relations, has ever been to the front. The extent also to which scientific pharmacy has been enriched by the results of work done for us, cannot at the present day be accurately estimated, but it is very great—so great as to justify fully the step taken by our predecessors, in the days when there were no examinations to pass and no legal responsibilities to encounter in practising our ancient and honourable calling. The fundamental difference between the British Pharmaceutical Conference (an assembly of pharmacists meeting annually in different places for friendly intercourse in an unofficial manner and promoting pharmaceutical research in all its branches) on the one hand, and the Pharmaceutical Societies of Great Britain, and of Ireland, (statutory bodies with official residences, each in possession of a charter, with powers and duties under various acts of parliament) on the other hand, cannot be too often emphasized. The unofficial body, for one thing (without considering its inestimable services in research), unencumbered with legal responsibilities and duties as a body, can discuss freely, if it cares, problems which a body like the Pharmaceutical Society, and its Council particularly, cannot do, because the latter body has to administer Acts of Parliament, and in doing so is in a quasi-judicial position. Here we are advocates, pleaders in court, with a cause which we deem a righteous one, and we can enter into negotiations with outside persons or bodies of persons at any time whenever we find it necessary for our own protection or for the safety of the public so to do. For instance, in an unofficial and friendly manner we could discuss questions of mutual interest with unofficial groups of members of the medical profession—questions which are scarcely ripe for treatment by the official bodies. We could thus often facilitate a change in the laws and leave the Pharmaceutical Society and its Council to deal with the problems in their riper form and to administer (as it is their duty to do) the new laws brought about by combined action and public opinion.

When I was a much younger man than I am now, I used to be puzzled why such a great country as ours should be so backward in many matters relating to medicine and pharmacy. Particularly was I struck with the fact that pharmacists in this country neither received the same training nor were accorded the same status as was given to their brethren in France and Germany and in the other great states of the Continent. It seemed to me that this country—in the very foremost rank among the nations of the world—should have no difficulty in seeing the condition of subjection of the pharmacist and at once rectify matters. Specially did I have this view with regard to England. These were, however, the views of the unequipped, the inexperienced, the enthusiastic young man with a buoyant spirit and the will to organize humanity in one day and to put the world right in six. The power only was a-wanting. If that could only have been obtained, what a transformation would have been effected! But the effluxion of time gives experience; with experience comes knowledge; and the wise man knows that the cart of progress moves slowly because error and prejudice are like bars of iron thrust between the spokes, and must be removed, before the cart makes even the slightest progress onward.

(2) The General Problem.

When we consider the constitution of society, we see it to be composed of a series of classes, many of which more or less depend on one another for their existence, and some of which are frequently in a condition of antagonism with each other. We have a play of forces, and it is the resultant of this which constitutes the motion of the whole—a motion which may be either progression or retrogression. It is also possible that there may be no motion, but a mere standing still. In civilized man, his institutions, his achievements and his struggles to live and to get on, we have merely a particular example of the operations of the laws of heredity and of the influences of environment. This is an opinion based on historical and biological grounds. If a man or a group of men succeed in imposing their will upon a nation, they do so by sheer power of intellect, character and position. The two first-named factors have been shown to be heritable, and the latter factor is also largely inherited. If a class succeed in maintaining or advancing its position, it may succeed in doing so, because it is necessary to society, but it may also succeed by its being in a position of power. Its success, therefore, is the result of a complex composed of environment and of the inherited qualities of the class. But in no case can it be said that the change effected is the absolutely right one; neither can it be said that any particular standard of society is the absolutely right standard. It is more scientific to say that it is an adaptation to the surroundings or is a resultant of the forces at play, and has no theoretical standard as being either right or wrong. These are relative terms, referred to the standard of the person or class using the terms.

It is, I think, perfectly obvious that the conditions of life of our own class or of any other class are affected by the general welfare of the State we belong to. Whatever progress the State has made in the past is shared to a greater or a lesser extent by every individual and every group of individuals within the State. So that in taking a general survey of our own position in the past, and in attempting to prognosticate our future, it is our duty to ascertain, as accurately as we can, the internal history of our country, and its relations with our immediate neighbours in the first instance, and, secondly, to collect data concerning ourselves as a class for analysis and deduction. No attempt has been made to do this, up to the present time, on a sufficiently large scale or in a systematic way, but until this is done, we work very much in the dark. One man cannot possibly attempt the systematic collection of data; he can only indicate what data appear to be necessary. We can with truth aver that it has been our consistent desire as a body to develop pharmacy, to maintain past traditions, to ensure proper training for future entrants, to extend research, all for the one purpose, namely, of securing for the public the proper administration of medicinal compounds, while at the same time acting as guardians of the public weal with respect to poisonous materials of all kinds. This is the *raison d'être* not indeed of our own existence but of our existence as a class. It does not matter either to us or to the State what leads any individual in early life to enter a calling or to join a profession. The circumstances are interesting only to each individual. The motives no doubt include among others that of making a livelihood at an honourable calling. It has also recently been shown that there is a distinct tendency for one to follow the parental calling. But once having embarked in the chosen career, the novitiate soon finds that his life history and the life history of his class are no exceptions to the life history of every individual in every class in all organized society. There must be individual efficiency and class efficiency to succeed. There must be obedience to the will of an unrelenting all-embracing social organization. As a citizen, the pharmacist, like other citizens, must be a good citizen ; and, as a skilled citizen he must exercise his skill for the public good. No matter what individualistic or selfish motives he has, in common with the units of every class, he must conform to the guiding principles of the State. But what he finds to be a compulsory duty he finds to be to his interest to perform. This is an axiom not peculiar to our craft, but is of general application to all citizens.

It is a practice among some of us, when discussing various internal problems, to look across the Channel and to point to the different and presumably better position of pharmacy on the Continent. It is no doubt desirable that such conditions existing on the Continent as would be deemed advantageous to us should be advocated, and if possible adopted here, but one cannot expect *a priori* that the conditions and status of the class in another State are the same as in our own, or, indeed, should necessarily be the same. For one thing, the State with which we are compared may not be so fully developed as our own. Besides this, the origin and mode of development may differ considerably. This is the case with both medicine and pharmacy. On the Continent there has been more protection of class interests. Here in this country the general actions of the individual has been less restrained. The principles of liberty as they have been developed in the British race have this effect upon all classes, namely, the legislature is slow to grant special and exclusive powers even to highly-trained persons. Every man can be his own lawyer, his own medical adviser and his own merchant. The development of the chief Continental races has proceeded in many ways quite differently. It is, therefore, seen to be unwise and impracticable to advocate the adoption *in toto* of Continental methods, or to attempt to graft them on to ours without at least considering in the first place whether they are suitable to our environment. The laws prohibiting apothekers from prescribing even simple remedies, or prohibiting others, although capable, from practising pharmacy, are examples. Rather should we keep in mind our own social conditions and mode of development and continue to strive to improve by slow steps the preparation and administration of medicaments in such a way as is understood by the public as being for the nation's welfare and safety, and not for any class advantage of our own. By this method we should not only secure the national welfare in an important aspect of it, but we should obtain greater security and fuller recognition of ourselves as a class of society. No class of society that is useless to the State can hope to continue to exist indefinitely, and no class that is useful can fail in the end in getting its proper place in society. Now, that is what we are after. We perform necessary work for the State. We are protecting in certain ways its members, and we are aiding to develop the State in more than one direction. We therefore desire that that measure of recognition and reward should be meted out to us which is the outcome of faithful service and useful work.

These general remarks I feel to be a very necessary preamble to what I am going to say with respect to recent legislation and with regard to the present condition of pharmacy and its general bearing on the public weal. It cannot be too often insisted upon that before one can understand the condition of one's own class and judge as to the proper course to be taken with respect to it, one must have a general grasp of the leading social problems which affect the whole country. What are the general social problems? What are the relations which pharmacy and medicine bear to these? I have already expressed the opinion that we cannot answer these questions in a satisfactory manner for want of data. We can only indicate generally what data are necessary for an approximately accurate solution, and give what must be very cautious hints, leaving the proper problem to other workers of the future.

In considering general social problems, we want to keep in mind two factors, the individualistic and the communistic. These two may be frequently in agreement, but generally they are opposed to one another. An individual has a very great interest in developing his own powers. The fact that an individual does develop his own powers as far as he can is a factor in human affairs, and that factor we recognize as individualism. But men not only look out for themselves individually, but they also combine into groups in order to attain a common mutual object which they cannot attain individually. The word communism can be used to convey the meaning here implied and to express this tendency. These two factors are certainly the chief if not the only ones in the social struggle for existence. But man acting collectively can do so from several motives, which might be classified as follows —

CLASSIFICATION OF MOTIVES WITH EXAMPLES.

For Material Gain.	For Privileges, "Rights" and Comforts.	For Humanistic Reasons.	From Desires due to other Instincts—For Honour, Position, Pleasure, etc.
Commercial firms. Insurance Companies. Commercial Companies of all kinds.	Parliament. Town Councils. County Councils. Associations of all classes of Society, e.g., Law, Medicine, Pharmacy.	Private and public philanthropy. Friendly Societies. Infirmaries. Asylums. Hospitals. Benevolent Institutions of all kinds. Scientific Societies for advance of knowledge.	Corporate bodies for amusement, etc.

Man individually may act, of course, from similar motives, and also from a sense of duty and from other motives the classification of which I need not attempt. But if we keep in view that we collectively fall into three places in the above system of classification and act (1) for material interest, (2) for privileges and (3) from humanistic motives, we shall be in a fitter position not to confuse issues, by remembering in each case what prompts us collectively to act.

Let me now suggest to you what data I should like to see collected, classified and analysed.

(1) We have in the Register a list of qualified persons. An annual list of proprietors for each locality is desirable. I do not say the Pharmaceutical Society should make this list, but somebody should make it. Existing Directories could form a basis for preparing this annual list.

(2) A statement of the nature of the business in each area. To obtain this, and as a first approximation, an analysis of the Returns from various pharmacies selected at random through-

out the country, is necessary. As an example, here is an analysis of the Returns of an American pharmacy, taken from the proceedings of the American Pharmaceutical Association, 1906 (vol. 54, page 297).

Class of Articles.	Per cent. of Sales.	Per cent. of Time required.	Per cent. of Profit.
Patent medicines	30	10	5
Soda water and cigars.	20	15	15
Sundries.	15	15	10
Drugs	15	20	30
Prescriptions	20	30	40
Conveniences	—	10	—

(3) Economic overlapping of labour. A return of the number of medical men dispensing throughout the country is desirable. Irregular dealing in drugs is common ; there are difficulties as to clubs ; there is the new difficulty with respect to the sale of poisons by licence. We want information as to all the foregoing collected and classified.

(4) There are economic problems of a general character. For example, there is the misplaced labour on patent medicines.

(5) We want a complete survey of all articles in general use in dispensing and in demand by the public. The data as to the articles dispensed are very scant and are insufficient for the guidance of the General Medical Council in its revision of the Pharmacopœia.

(6) Legal problems. We have scattered through the pages of the Journals full and useful information with respect to judgments. Good sound advice is also to be found there. Both should be collected, classified and commented on.

(7) A classified statement as to deaths and injuries of all kinds due to mistakes and negligence and the unskilled handling of poisons is desirable.

(8) There are ethical difficulties. To what extent does etiquette prevail among pharmacists ? A Return as to this and as to the nature of the relations of pharmacist and physician throughout the country are both desirable.

(9) We want a statement prepared showing what examinations are taken by apprentices for the purpose of securing registration. A statement of the facilities afforded to provide intending entrants with the sort of education suitable to attain their object is most desirable. Information as to the schools of

pharmacy is given in various journals. The opinions of the principals as to the work done by their students, and a return as to the time taken and standard attained by the students individually, without their being named, would be of great service.

10. Scientific problems. We want no special return made up with regard to scientific problems, because the Conference issues one annually. It appears to me that this, the tenth heading, is the only satisfactory one. We want more problems stated, perhaps, and more workers. We want results which will tend to the establishment of the manufacture of more chemicals and preparations at present supplied from abroad, and which could without difficulties, except those of capital and brains, be manufactured in this country.

Do not be alarmed. I am not going to deal with all these problems to-day. I merely state them. I wish now, however, to look into one or two of the simpler problems, but before doing so, let me take a brief retrospect.

(3) Retrospective.

I shall not attempt to trace medicine and pharmacy from their emergence as entities down to the present day. That is unnecessary for my purpose, and, besides, it has been exceedingly well done by some of my predecessors in office, and by other pharmacists in various ways. But if we consider the condition of affairs for a moment about the year 1841, we observe that the class, which had been denounced as intruding upon the sphere of the apothecary and the physician with regard to the preparation and dispensing of medicaments—namely the chemists and druggists—had succeeded in winning, if not to any great extent the confidence of the medical profession, at least that of the public to such an extent that the Government of the day considered favourably their application for a Royal Charter, which in due course brought them into existence as a corporate body. I wish to refer to this fact later, and to ask you to bear it in mind while dealing with present intrusions in the craft of pharmacy, the fact, namely, that our precursors, the chemists and druggists of a hundred years ago, were regarded as intruders in what was distinctly then a branch of medicine. But while they were undoubtedly intruding in the sphere of those who were engaged in the regular practice of medicine as understood then, they must be exonerated from any charge of endangering the public weal. On the contrary, they supplied a felt want. They accommodated the public, and the proof of this lies in the fact that they have grown in numbers and have continued to increase their efficiency in the sphere which is now their own. But prior to 1841 they had no status, no corporate existence and no collective powers. The great object of Jacob Bell was to organize pharmaceutical practice, to ensure that entrants were properly trained, and to raise pharmacy to the status of a profession, just as it was and is at the present time a profession on the Continent. When he succeeded in 1852 in getting the Pharmacy Bill through Parliament he realized his hope to establish corporate pharmacy. Jacob Bell, by the successful application of the collective principle in pharmacy for the first time in this country, gave status to his class and gave proof of the validity of its arguments to exist as a class. We see how slow the rate of growth is in all society, for while the Queen in 1843 gave a charter to the Pharmaceutical Society and the State gave it powers in 1852 by Act of Parliament, no powers were given to act in the public interest. Titles, merely, were protected. The State merely gave the Society power to render as efficient as it cared the members of the group who banded themselves together to protect and extend their own interests. The powers, however, to act in the public interest came in 1868 as the result of long continued strenuous endeavours on the part of the Pharmaceutical Society and other bodies and individuals. The difficulties experienced were just the difficulties one would expect to occur in a free community with so many individual and class influences at work. Now what did the Act of 1868 accomplish in the interests of the public? Consider for a moment the state of pharmacy in 1868. Chemists and druggists existed as a class in 1868 from Land's End to John o' Groats. To become a chemist and druggist one had, not by law, but by the strong force of tradition, as in other employments, to serve an apprenticeship and to undergo a further training as an assistant. There is little doubt that prior to 1868 they efficiently performed their duties in preparing and dispensing medicaments, and that they exercised reasonable care, due to their training, in selling such poisonous substances as were in public demand. But the relations of both medicine and pharmacy to the public had become more complex by 1868. We must bear in mind that the country had recovered from the depletion of the population, due to the great wars and to excessive emigration, and that the population was now rapidly increasing. There was the shift in the balance from agriculture to industries. There were the discoveries in chemical science which led to the introduction of new remedies. There was a marked increase of the material comforts of the general population. There was the consequent increasing demand for curative merchandise. The time was thus ripe for the fuller recognition of a class whose function was to relieve the physician, if he so desired it, of the extra labour of preparing the medicaments he advised should be used in cases of sickness. The statesmen of the day, therefore, made fully aware of the changes that had taken place, recognized it as their duty to ensure protection to the public from the indiscriminate handling of poisons by persons who had no adequate idea of their properties as poisons or as remedies; and they gave legal status to the class which was evidently most fit to perform the duties so necessary in the public interest. What the Act of 1868 did, therefore, for the public was this. It left the public quite free to choose as formerly who should supply them with medicinal compounds, just as the public is left quite free to take medical advice from any individual whatever. But the services of a specially trained class were rendered available to the general population—a class which, because of its training, was empowered to be the sole distributors of potent medicinal poisons. This power was given because in so doing the State was aware the public would be protected, but in no way was the general trade in medicines and poisons interfered with. In brief, there was no special trading privilege granted to the chemist and druggist of 1868; there was no granting of protection in the economic sense—but there was a real protection extended to the public. That was, in short, a protection of the lives of citizens from the danger of an indiscriminate and useless distribution of highly poisonous substances.

Now there has been for forty years much discussion as to the scope and utility of the Act of 1868. By many it has been held to be almost without value either to the public or to ourselves. This arises from the fact that few of the dangerous poisons were included in the schedule, that the dispensing of prescriptions was not legally recognized as the sole duty of the pharmacist, and that certain of the provisions of the Act were very frequently evaded without justice being meted out to the law breakers, and from other reasons. There is no reasonable doubt but that pharmacists had good grounds for complaint on all these heads. In particular, it was and is very galling that a high standard of training for entrants to pharmacy should be insisted upon, only to find it in after years a calling the practice of which is very far from being confined to the trained man, especially with reference to the dispensing of prescriptions. But, all things considered, I think the Act of 1868 was a great Act—an Act which, with forty years' experience in working behind it, has proved to be of real utility to the State. Think what has been done with it. It prevents the sale of poisons by deputy—the seller must be qualified. That is one great source of protection to the public. It has produced a body of well educated, specially trained, and highly skilled men. The Pharmaceutical Society has developed into a powerful organization. The Council is a responsible public body with statutory powers. Its voluntary teaching department is in the hands of men of the highest scientific attainments, and it has examining powers of such a character that it can and does insist on a high standard of professional knowledge. It is fifty years last month since pharmacy lost Jacob Bell. Not exactly in the way perhaps which he thought of them have his ideals been realized. But I hold and hold firmly that his ideals have been in the main realized, not only with regard to education and examination, but also with regard to organization and conduct. What has *not* been realized is the pharmacist as a purely professional man given up solely to the preparation of medicaments and dispensing, with no encumbrances, such as we now find to be absolutely necessary in the conduct of pharmacy in the kingdom.

This brings me to think of what would have happened if the Pharmaceutical Council, during the past forty years and especially during the first twenty years after 1868, had acted differently from what it has done, especially with respect to education and examination. It was open to the Council in 1868 to continue the Minor examination on a standard equal to and not exceeding the assistant standard, because of the many entrants who desired to become chemists and druggists with the object mainly of selling drugs and poisonous substances along with their general merchandise. It is easy to understand this object, because these men were located in districts where medical dispensing was the rule, and therefore where no opportunity existed to exercise that part of their calling. The Major diploma would have continued as the evidence of training of the principal. How would that have worked out in practice? Would the pharmaceutical chemist have abandoned the sale of accessories and have confined himself simply to the preparation and dispensing of medicines? Would he, in short, have become more of a professional man, like the *apotheker* or the *pharmacien?* Finally, with the legal right to dispense medicines would the chemist and druggist have confined himself to the work to which the German and Irish druggists have had to confine themselves? These are not idle questions, but it would serve no useful purpose to advance an opinion or to attempt to answer them here. Such answers as would be given belong to the region of hypothetical speculation and not of theory, for there is now no hope of applying the test of experience to them. What the Pharmaceutical Council did from 1868 onwards was to carry out its duties, as laid down in the Act, of administering it and of examining all those persons who desired to be registered as chemists and druggists, at the same time bearing in mind the provisions of the Act respecting the sale of poisons and the practice among chemists and druggists of dispensing medical prescriptions, recognized in the Act as prevalent at the time. Since chemists and druggists continued the sale of all kinds of proprietaries and since medical practitioners in England continued to supply medicines to their patients, it was therefore quite impracticable to realize the professional pharmacist in the Continental sense. We have, therefore, developed on lines purely insular and we stand out as an excellent example of a class looked upon as an intrusion for a generation or two by those into whose sphere we entered, but really a class demanded by society as a necessity when the organism had become more complex.

It must, I think, be recognized by the impartial student of our affairs that the course adopted by the Pharmaceutical Council in securing the increased efficiency in pharmaceutical training, by modifying the qualifying examination from time to time to meet the increasing knowledge in pharmacy and allied sciences, was the right and only course open for the Council to take. There are those who hold that the standard of knowledge and of technical training now required is too high and beyond the necessities of the case. I cannot agree with this view, and when I come to speak, as I shall presently do, on the subject of education and examination, I shall advance good reasons for the course taken by the Council and against the view that a lower standard would be sufficient.

(4) The Communistic Factor enters Pharmacy.

Let me, in the first place, rapidly trace the course of events which has led to the amendment of the Act of 1868 and to the passing of the Act of 1908. The two Acts are clearly founded on different principles. In the first place the Act of 1868, although dealing with a corporate body, is purely individualistic in conception. In 1868 individual pharmacists formed the corporate body, and individual pharmacists practised as such. In 1909 individual pharmacists still form the corporate body, but it becomes possible for a group of unqualified persons to combine together and under certain conditions dispense medicines, sell poisons, and call themselves chemists and druggists. In 1868 the distribution of potent poisons, including arsenic, was placed in the hands of pharmacists, as being trained persons who would exercise due caution in their sale, and therefore protect the public from danger. In 1909, arsenic can be bought, under certain conditions, by retail by members of the public from untrained, unskilled vendors—persons who are not chemists and druggists. How have these changes come about ? Have pharmacists indeed lost the confidence of the State, despite the fact that instead of a race of unexamined chemists and druggists in 1868, we have in 1908 a race of men whose training has been long and severe, whose education at schools of pharmacy has been of the most technical character, and whose examination tests in chemistry, botany, and the various branches of pharmaceutical science have been most stringent ? No. Pharmacists have not lost the confidence of the State or of the public. The changes are due to the progress of collective principles, and to the fact that pharmacists are not only professional men, but also traders. Think for a moment how the changes with respect to the title and to drug companies have come about. The legal case in which it was decided that a company was not a person within the meaning of the Act was tried only twelve years after the passing of the Act. I think that there is no doubt that, but for the fact we are traders as well as professional men, engaged in distributing goods which it was open to any untrained person to distribute, we would have been able to amend the Act of 1868 in such a way as to prevent any unqualified group of persons from usurping our title and practising as pharmacists. I am not going to assert it as a fundamental principle in economics that it is for the public weal or the public interest to have a multiplying of small establishments for the purpose of easy purchase of all sorts of commodities, or whether a more rational and less wasteful method is desirable. But we must accept it as a fact that this sort of distribution holds throughout the country. In the struggle for existence and in the desire to succeed commercially, a new group sprang up among us, who sold our goods and in general practised with more or less efficiency the calling of pharmacy. I refer, of course, to the drug companies. We were called upon to consider whether their incursions could be stopped, or whether their practice could be regularized. We are all perfectly familiar with the long struggle against this collective onslaught and for our rights as to the title of chemist and druggist, a title obtainable by individuals only by examination and registration. It pains us to recall the adverse legal decision of 1880 and the inaction, want of influence, or the misfortune of our own administrators in their attempts to establish the *status quo ante.* There is no use crying over spilt milk. We must now dispassionately examine the new situation and attempt to realize what has been accomplished. To-day any British citizen desirous of having a prescription dispensed or of purchasing such an article as, say, oxalic acid, can do so if he seeks out a shop where the title "chemist and druggist" or "pharmacist" is exhibited. If he enters he should see there, hanging in a conspicuous place, the certificate of qualification of the person in charge of the establishment. If he sees this, he is certain to be in safe hands, for the person in charge is qualified to supply his wants. If, on the other hand, he failed to observe the title "chemist and druggist" or "pharmacist" either outside or inside the establishment, but merely "drug store" or some such name, then he is not likely to be engaging the skill of a trained pharmacist, but is merely dealing with a merchant, who, if he sells the poison, breaks the law. Here, therefore, we have no apparent difference between 1868 and 1908 conditions. The difference is not one affecting the relationship of the public and the pharmacist, but one affecting the pharmacist solely, and that on the financial and professional sides of his calling. But there is a real difference between the conditions of 1868 and 1908, for all that. The capital laid out in the pharmacy may or may not be entirely the capital of a chemist and druggist. The control of the pharmacy on the financial side may or may not be in the hands of persons who have no knowledge of pharmacy, but the management of the pharmacy and the transactions which necessitate the calling into requisition the professional skill of the pharmacist, are entirely in the hands of a registered man. I do not think it possible to give an exact parallel, in other walks of life, to that of the qualified pharmacist as a director and manager of a company. But conditions of a somewhat similar nature exist even in the medical profession. Consider, for example, hospitals, infirmaries, asylums, and other institutions for the infirm and sick. Here the financial control is outwith the medical profession, but this does not prevent the medical practitioner or medical specialist from duly exercising his calling. The existence of these institutions is, of course, due to a different motive on the part of the community. The motive here is humanistic—is due to sympathy for the weak, rather than a desire for material gain on the part of the promoter—but this does not alter the position of the qualified practitioner towards the promoters. The strong desire to trade for material gain cannot be suppressed, either in pharmacy or in any other calling. Here, then, we have in pharmacy a concrete example of the operations of the two factors, individualism and communism, which permeate the whole State. And it appears to me that the latter factor is gaining ground. This requires and deserves the closest study from our administrators, for unless we collect and collate the facts and keep a grip of the problem, our insight and foresight will be poor and our actions feeble and futile. It is the paramount duty of our leaders to consider the play of these two factors. Neither is fundamentally right or wrong. They exist. They are the products of the fundamental human instincts, and force themselves upon the attention of all students of history. All we can do is to strive to know the standpoint of each, and to act only for the public weal.

> For when disputes are wearied out
> 'Tis interest still resolves the doubt.

(5) THE ADVENT OF THE LICENCE.

The company problem came before us as the result of a defect in the Act of 1868. It could not be reasonably expected of the Legislature to foresee the probable advent of companies and to divine the legal judgment with respect to a "person." The licence problem was forced upon our attention in quite a different way. We were told that the facilities for the purchase of arsenical and other preparations in large demand for agricultural and horticultural purposes were inadequate in many parts of the kingdom. At the joint Committee of the Lords and Commons the authentic written evidence disproving the want of facilities was offered to but was refused by the Committee. At a meeting of the North British Branch, I spoke from personal experience of the North-East of Scotland as to the abundant facilities existing there. Scottish pharmacists at that time made strong representations to the President, Mr. R. A. Robinson, who came down especially to hear our views on the subject. All the same the outcome of this agitation was that Parliament gave power in April to local authorities to grant licences (where they consider necessary) to sell mixtures of one or two very potent poisons, namely arsenic and nicotine. The number of the poisons is restricted to two; the purpose for which the poisons are to be used is restricted to one, namely, the destruction of weeds and of parasitic life in the domains of agriculture and horticulture; and finally, the licence for the sale of such poisons is presumed to be given only in cases where, through there being no chemists and druggists willing to sell or already selling these packed poisons in the vicinity, the facilities are inadequate for their purchase by the public. Now we must try to ascertain, if possible, the object of the legislature in thus altering the excellent provisions of the Act of 1868 with respect to these poisons, especially since the Pharmaceutical Society and its officers have shown that there was no necessity to alter or amend the Act in this direction. Just consider for a moment the nature of the practice of pharmacy. Like the practice of medicine or of law or of any of the trades, callings, or professions whatever, *it is not of a uniform character.* Just as we have medical specialists of all kinds and general practitioners with all kinds of practices, so do we have pharmacists with all sorts of businesses. This arises in the pharmacist's case from local social conditions, from the environment of the pharmacist, from the various branches which constitute the craft, and from the pharmacist's own tastes. You know quite well that in most of the chief city pharmacies, no sheep dip is stocked or sold, and you are also aware that, in many provincial pharmacies, dips and weed killers and general merchandise together with drugs and poisons are sold, while no dispensing worthy of the name exists. The high-class pharmacies of the cities do not stock these agricultural poisonous mixtures, either because there is no demand for them there or because the proprietors do not want to sell them, or both. These are the facts. Poisons for general purposes can be got at any pharmacy. Packed poisons for one or two specific purposes may not. But let me pursue the subject further from another side. There has been a very great deal of evasion of the provisions of the Act of 1868 with regard to the sale of packed agricultural poisons. I admit it has been difficult to catch, red-handed, persons infringing the Act. The fact remains, however, that the ironmonger, the seedsman, and also the general merchant, are reputed in many places to be the chief and sometimes the sole distributors of the very poisonous mixtures we are considering. It is to the manufacturers' interest to sell all he can of his goods, and so long as he gets them sold it matters little to him who sells them. These manufacturers are, many of them, persons of means and influence and they have succeeded in getting into touch with parliamentarians and other constituted authorities. They wanted the means of free distribution and not a distribution restricted to chemists and druggists—and they agitated to get it. Parliament could never agree to this but, with the aid of Departmental authorities, it adopted the view that the statement as to the want of facilities was correct. Hence it has come about that pharmaceutical authorities have been induced to agree to the institution of another form of distribution applicable only to two poisons under certain conditions. That form of distribution is an experiment, in my opinion, of a dangerous nature. No skill is here demanded by the State from the dealer. He must simply be a person of probity. It appears to be an assumption on the part of the State that the dealer is as familiar as the purchaser is as to the use the poison is put to, and as to the method of using it. This we know is the adequate reason why wholesalers are exempted from the provisions of the Act respecting the sale of poisons. In any case, because of their frequent use in commerce, arsenical and tobacco preparations (and these only for definite purposes well known to the user) may now be sold—provided any local authority so decide—by seedsmen and the like who supply agriculturists and horticulturists with other articles of commerce. The theory is that the local authority will not grant licences excepting where there are no chemists and druggists within a reasonable distance, and, therefore, where facilities are inadequate. How is this working out in practice? All over the country we find many local authorities granting licences indiscriminately. We have notable exceptions here in the North of England; for example, Liverpool and Hull have very properly refused licences on the ground that the facilities are ample. It is clear that many of those local authorities that have granted licences (despite the fact that facilities are abundant in their localities) have done so because they are under the exceedingly false impression that pharmacists have a thoroughgoing monopoly which they exercise in their own interests and against those of the public. What are the facts ? The poisonous mixtures are put on the market by manufacturers just as other substances are put on the market. These manufacturers sell most of their packed poisons direct to the user, and only a small fraction goes through the retailer's hands. There is competition, and often fierce competition, among pharmacists in selling the items of which this fraction is composed, just as there is competition among them in selling all their other commodities. It is not because we are trying to secure an advantage over any class whatever (for we have no such advantage of any kind commercially) that we seek to regulate the sale of poisons and restrict their output to pharmacists, but it is because we are conscious of the danger to the public arising from the fact that poison at all is at the command of any member of the public,[1] ignorant of its properties and incapable of prescribing the necessary precautions in distributing it. In my opinion we must either have an amendment of the Act of 1908 itself—such an amendment as was drafted by Mr. Glyn Jones and which was rejected by Lord Crewe—or a change in the Order in Council, to attain the object Parliament had in view in creating licences. If the change is to be made in the Act itself, the addition of the following sentence to paragraph 2 of Clause 2 might suffice : "Provided that no licence shall be granted by any local authority to any person whose place of business in which he desires to sell such substances is less than six miles from any chemist and druggist who can meet the reasonable requirements of the public." If licences for these poisonous mixtures are necessary, they are necessary only where there are no qualified persons willing to sell. This is axiomatic. Licences granted indiscriminately simply means the institution of a new class of poison vendor. This is how Clause 2 of the Act of 1908 is to work out in practice as it stands. The members of this new class, who, for the purposes indicated, are to be put on a level with pharmacists, are to be composed of persons who have had no prolonged apprenticeship, no education in schools of pharmacy, and no technical skill whatever. The new vendors of packets of poisons for agricultural and horticultural use will differ from the Irish druggist, as to their powers of sale, only in degree. Their existence, and the extension of their sphere to other poisons, might soon be justified, owing to the demands made upon them by the public. With the aid of manufacturers, they will tend to pass from distributors of specific poisons to distributors of all poisons whatever. So that we may soon have here a situation similar to that which existed 100 years ago and even 50 years ago. We may have a class intruding on our ground just as we chemists and druggists intruded in the sphere of medicine 100 years ago. It must be pointed out that the Poisons and Pharmacy Act of 1908 might be utilized to further this possible project, for provision is made in the Act for the addition of poisons to be sold by licence if considered necessary. There is one specific qualification to this, however, but it is conceivable that it may be disregarded. That qualification, which ought to prevent the extension of the list to general dealing in poisons, is that, whether the poison is arsenic or nicotine or any other which may in future be added to the list, the poison must be for agricultural or horticultural use only. Rather than permit the principle of licensing to sell specific poisons being extended to poisons in general, I would be inclined to advocate the creation of a new class of druggist such as exists in Ireland and on the Continent. This is undesirable and unnecessary, because the public is far better served by the highly-trained pharmacist, but it is distinctly preferable to the principle of licensing, with its attendant dangers. *It ought to be a principle with the Legislature to keep the standard of qualification and skill of the pharmacist, as dispenser and poison vendor, uniform, and leave the pharmacist, on securing his diploma, to seek the kind of practice and business suited to the local public demands in all its branches, and suited to his surroundings and his taste, just, for example, as we have in the professions of law and of medicine.* Great vigilance must be exercised in the future, not only by pharmaceutical authorities, but also by all authorities concerned with regard to this new form of distribution, which is at present entirely optional. It is not the intrinsic value of the poison sold which concerns the pharmacist. That is a small matter. It is the departure, in a particular case, from the very sound principle that the vendor of a poison must be a man of skill possessing a technical knowledge of poisons. The skilled vendor protects the community in which he lives from the danger attendant on the use of poisons, by ascertaining the real purpose of the purchaser, and by giving proper instructions and proper warning in each case. In the particular case of sheep dips and weed killers the State is assuming that both dealer and vendor *are aware of the dangers* and can take the necessary precautions. It is our duty to give, when necessary, full information and advice to local authorities when they are dealing with applications for licences. Time will prove whether the experiment which the legislature has been induced to make is a profitable and desirable one. The experiment is not ours; it is the realization of a Departmental view long held, and my last word on the subject is that the Privy Council, through the Order now in force, shows that it is prepared to accept the risks.

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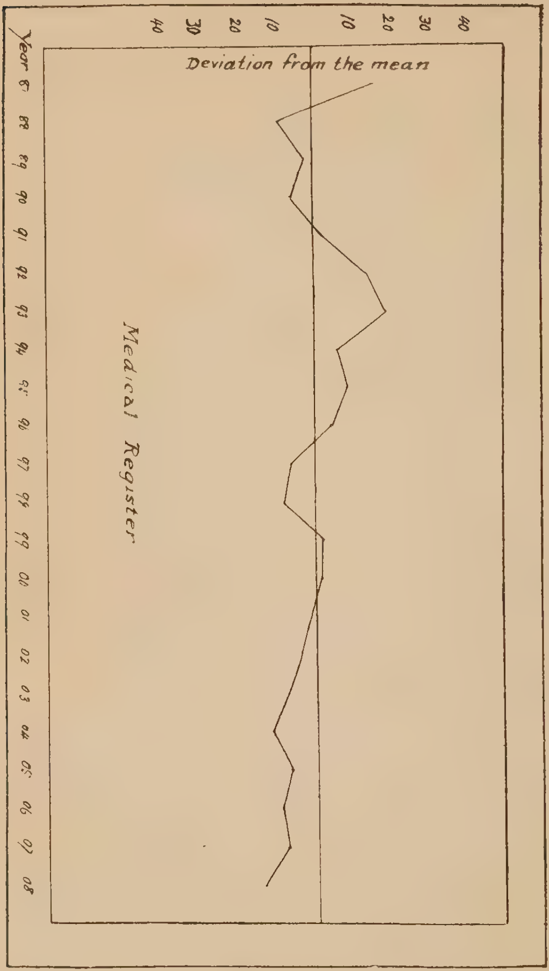
[1] There is real danger, for instance, to trout and salmon in streams and rivers due to use of enormous quantities of arsenic in sheep dipping. Many anglers hold that fish are scarcer and that arsenic is the cause.

(6) Some Economic Problems.

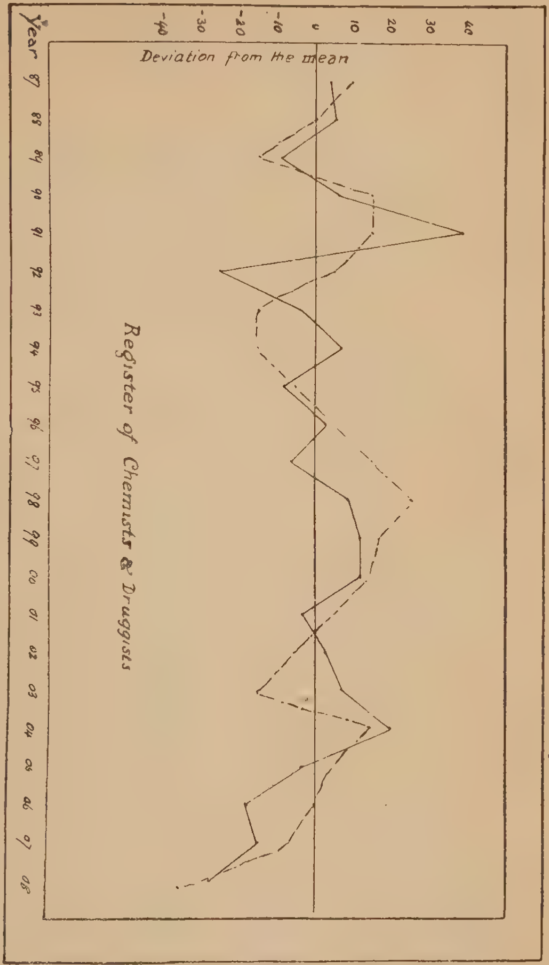
I have made an attempt during the past year to collect data respecting the economic conditions prevailing locally throughout Great Britain, without much success. The number of replies to inquiries made has been small. Those who replied have, however, given valuable information, and information which would form the basis of further inquiry. I wish here most cordially to thank all those who sent in replies bearing on dispensing problems, economic and technical. I wish also to thank very cordially those members of manufacturing firms, members of the pharmaceutical press, and others, who sent me information bearing on the prices of chemicals and drugs during the past century and on other economic points. Lastly, I have similarly to thank the officers of the Pharmaceutical Society for the material they have kindly placed at my disposal.

My object in collecting data of an economic nature was to aid pharmacists in satisfying themselves as to the actual condition of pharmacy from an economic standpoint, and as to what extent changes had been wrought, owing to the advent of the modern factors in civilization. I am sorry that, owing to the meagre data obtained and to the time and trouble required to incite people to give information and to work up the data when supplied, I have been unable to accomplish the task I set myself last year. The problems I desired to tackle must, therefore, be numbered among the untouched group detailed in the introductory portion of my address.

I shall, instead, make a few general observations based on the data I have been able to collect and on my own experience. In the first place, it is of interest to note how small a class of the community we are numerically. There are about 14,000 pharmacists on the register, which works out at about 35 per 100,000 of the population, or a little over 3 per 10,000. We are small numerically compared with the medical profession, for they number over 40,000, or approximately 10 persons out of 10,000; or 1 in 1,000 of the population are medical practitioners. We are quite aware that those on the Registers are not, all of them, in actual practice; they represent only those qualified to practise. In the case of the medical profession, the many public medical and scientific appointments of all kinds, both at home, in the colonies, and India, which have to be filled by registered medical men, together with the ordinary demand for medical aid generally, account for the comparatively greater number qualified to practise medicine, compared with the numbers following the much more restricted craft of pharmacy. Now it has been observed by some that the number added to our Register annually in recent years has been uniformly decreasing. This has been explained by a few as due to the increased stringency of



the qualifying examination, but this is not the cause. No doubt a change in the standard affects the number passing just before and after the change. An examination of medical and general economic data soon shows, however, that the fluctuations are mainly due to economic conditions. The number of annual additions to the Medical Register has been slowly decreasing during the entire past decade, but the fact may be put in another way. From 1891 to 1896 there was a marked rise in the number of additions. In our case the rise in the numbers added to the Register took place in 1891 and from 1898 to 1900, and were due to a coming change in the standard of examination and to a coming change of fee. Otherwise the periods of increase in both Registers correspond to periods of relative prosperity. The



Note on Diagram.—The above diagrams show the deviations from the mean of the past twenty-two years in each case. In the above diagram (p. 215) the solid line refers to "Chemists and Druggists" and the broken line to the "Unemployed." The latter curve is drawn to a different scale.

periods closely correspond to the years when general wages were higher, unemployment was less, and with other favourable economic conditions. The accompanying tables (Tables I and II) show the absolute and relative rates of increase and decrease based on the figures given in both the Medical and Pharmaceutical Registers and in the Government Returns.

TABLE I.—MINOR EXAMINATION.

Years.	Number of Candidates examined.		Number of Successful Candidates.		Number of Persons on the Register.	Number added each Year.	
	England.	Scotland.	England.	Scotland.			
1870	258	31	177	22	—	—	
1871	324	47	204	30	—	—	Differences only, up to 1887.
1872	472	35	264	23	10,389	—	
1873	745	75	410	46	10,896	507	
1874	980	180	300	78	10,939	43	
1875	221	64	104	37	10,941	2	
1876	391	77	191	41	10,857	– 84	
1877	442	94	229	70	11,013	156	
1878	528	111	257	67	11,022	9	
1879	525	131	268	72	11,252	230	
1880	551	102	250	61	11,154	– 98	
1881	567	83	278	47	11,347	193	
1882	572	78	242	44	11,172	–175	
1883	632	134	235	59	11,417	245	
1884	722	158	245	81	11,165	–252	
1885	744	211	255	96	11,348	183	
1886	824	246	304	94	11,249	– 99	
1887	867	215	405	101	11,584	506	
1888	884	207	398	112	11,658	510	
1889	793	220	313	127	11,894	439	
1890	864	293	359	165	11,987	524	
1891	1,070	446	423	258	12,444	681	
1892	578	293	208	150	12,315	358	
1893	817	372	285	184	12,562	469	
1894	970	440	344	180	12,596	524	
1895	819	485	245	202	12,800	447	
1896	793	656	260	243	12,913	503	
1897	863	578	270	190	12,964	460	
1898	1,162	517	354	181	13,208	535	
1899	1,331	485	377	175	13,347	552	
1900	1,377	513	366	182	13,627	548	
1901	1,078	471	310	154	13,356	468	
1902	1,064	415	313	184	13,420	497	
1903	1,144	532	352	172	13,436	524	
1904	983	527	397	187	13,619	584	
1905	877	421	327	141	13,820	468	
1906	823	341	275	125	13,827	400	
1907	765	351	274	137	13,990	411	
1908	714	266	249	105	13,897	354	

TABLE II.

Years.	PHARMACEUTICAL DATA.								MEDICAL DATA.		
	Excess or Defect of the mean Number of Candidates for the Minor Examination.				Excess or defect of the Mean Number on the Register.	Excess or defect of the Mean Number added to the Register.	Actual Number added to the Register.	Percentage excess or defect of the Mean Number added to the Register.	Percentage excess or defect of the Mean Number added to the Register.	Excess or defect of the Mean Number added to the Register.	Actual Number of Persons added to the Register.
	Entering.		Passing.								
	England.	Scotland.	England.	Scotland.							
1887	— 71	—196	82	—65	—1,383	17	506	3·48	15·81	209	1,531
1888	— 54	—204	75	—54	—1,309	21	510	4·29	—10·44	—138	1,184
1889	—145	—191	— 10	—39	—1,073	— 50	439	—10·24	— 1·29	— 17	1,305
1890	— 74	—128	36	— 1	—980	35	524	7·16	— 4·24	— 56	1,266
1891	132	35	100	92	—523	192	681	39·26	1·74	23	1,345
1892	—360	—118	—115	—16	—652	—131	358	—26·79	14·45	191	1,513
1893	—121	— 39	— 38	18	—405	— 20	469	— 4·09	19·44	257	1,579
1894	32	29	21	14	—371	35	524	7·16	7·87	104	1,426
1895	—119	74	— 78	36	—167	— 42	447	— 8·59	9·38	124	1,446
1896	—145	245	— 63	77	— 54	14	503	2·86	4·77	63	1,385
1897	— 75	167	— 53	24	— 3	— 29	460	— 5·93	— 6·96	— 92	1,230
1898	224	106	31	15	241	46	535	9·41	— 8·47	—112	1,210
1899	393	74	54	9	380	63	552	12·88	2·19	29	1,351
1900	439	102	43	16	660	59	548	12·07	1·74	23	1,345
1901	140	60	— 13	— 8	389	— 21	468	— 4·29	— 0·30	— 4	1,318
1902	126	4	— 10	18	453	8	497	1·64	— 3·56	— 47	1,275
1903	206	121	29	6	469	35	524	7·16	— 6·73	— 89	1,233
1904	45	116	74	21	652	95	584	19·43	—11·65	—154	1,168
1905	— 61	10	4	—25	853	— 21	468	— 4·29	— 6·20	— 82	1,240
1906	—115	— 70	— 48	—41	860	— 89	400	—18·20	— 9·46	—125	1,197
1907	—173	— 60	— 49	—29	1,023	— 78	411	—15·95	— 7·64	—101	1,221
1908	—224	—145	— 74	—61	930	—135	354	—27·61	—13·99	—185	1,137

Where the term "mean" is used, the mean of 22 years' figures in each case is meant.

In view of the fact that there has been a great wave of depression in trade generally, greatly increasing the number of unemployed, it is satisfactory to note that unemployment is rare in pharmaceutical life. Taking at random from the journals (chiefly from the *Chemist and Druggist,* which contains the greatest numbers) the excess of situations wanted over situations open for a series of years, one finds that the maximum (and that for a short period) reaches only ·5 per cent. of registered men per week. This does not mean that ·5 per cent. are ever in distress, but merely the fluctuation, due to seasonal trade in the employment of qualified assistants. We may take it that practically all pharmacists who wish to work are employed, but there are a few "unemployable" men whose unfitness is due to inebriety or to unsuitable age, or both. On the other hand, a study of house rentals, habits of life and of death duties clearly show that the average income of the pharmacist is a comparatively small one, and that the accumulation of wealth, if not foreign to his nature, is at least foreign to his experience.

The sale of patent medicines from the medical standpoint is of doubtful service to the community. From the economic standpoint it does not bulk largely in the purchases made by the British public. The British citizens spend about £4 6*s.* annually in alcohol, but only about 1*s.* 4*d.* on patent medicines. Putting it more from the point of view of the pharmacist, if every registered person sold patent medicines, he would draw on an average about £20 annually from their sale. The profit from the sale of patent medicines is a small one on an average, and their sale must be reckoned as a small branch of a pharmacist's business. The suggested classification and analysis of income from sales I made in my introductory remarks would help the solution of the economic problem considerably. It seems to me that a much heavier stamp duty than that at present in force should be imposed on articles held out to have curative properties and which contain potent drugs, whether the articles are nostrums or proprietaries. The purchase of medicines of well known composition, such as pharmacopœial preparations and others from formulae published in standard works of reference, is quite a different purchase in its character from that of articles labelled with statements as to their efficacy. In the latter case the article takes the place of medicine supplied from a physician's prescription, which latter results from skill applied in each particular case. In my opinion, therefore, the disclosure of the contents of all packed remedies consisting of drugs in common use advertised or for sale (so desirable for the information and safety of the public) should be accompanied by a stamp duty to balance the loss due to the unemployment of skill in diagnosis, treatment and preparation of remedy. A tax of this kind would yield a sum which it is very necessary should be utilized for the public weal by the Pharmaceutical Society in vigorously administering the law respecting poisons.

A stamp duty on proprietary medicines declared to have specific virtue is a more rational proceeding than that of imposing a tax on alcohol, which covers not only alcohol consumed as a beverage but also that used as a medicine. I think it is in agreement with the instincts of humanity to aid the weak, the suffering and the incurable, all the more so if they are poor as well as ailing. The validity of the principle of imposing a tax on alcohol as a beverage we need not discuss or dispute. The principle of taxing medicines ordered by medical practitioners and dispensed by pharmacists is a bad one, because it operates more against the poor than the rich ; and a tax on alcohol means a tax on many of the most effective and most frequently ordered remedies for the sick. The value and universal use of alcohol as a solvent of the active constituents of drugs cannot be disputed, and at the present time no other liquid is known which could take its place. Under these circumstances it is easy to understand the action of manufacturers, retail pharmacists and pharmaceutical bodies generally, in discussing the increase of the spirit duty for the purpose of representing to the Chancellor of the Exchequer its injurious economic effect on hospitals, friendly societies and the sick generally, and, if practicable, of securing a rebate on alcohol used for medicinal purposes. The principle of distinguishing between alcohol used as a beverage and used as medicine is sound, but in practice there seem to be many difficulties. In the first place, we use and sell alcohol in flavouring essences, perfumery and in such potable tinctures as cardamoms. These are all liable to misuse by the public, and in the case of perfumery, we have a luxury such as whisky is. If, in the course of business, we used alcohol only as a solvent of drugs of such activity as to be dangerous except as medicines, the case would be a simple one. But we don't ; we stock alcohol and sell it in articles which are luxuries as well as articles which are necessary medicines. When, therefore, we represent to the Chancellor of the Exchequer the undoubtedly heavy incidence of the tax on poor people requiring medicine, we are confronted with these other difficulties. It seems to me that the only practical course open is to confine the increase of duty to whisky and alcoholic beverages sold by persons licensed to deal in these things, and to leave the duty on 90 per cent. alcohol for pharmaceutical use to stand at the former figure. There would be no great loss of revenue by this proceeding. If no relief or rebate of any kind is granted, then retail pharmacists, who have not shown the business instincts which manufacturers and others affected have done, must advance the price of spirituous preparations. In other words, the public must pay the tax. This is what was intended, but it is extremely doubtful whether pharmacists will be able to recover from the public the full sum which they are now called upon to pay.[1]

Through the courtesy of leading commercial firms, I have got some interesting figures bearing on the prices of drugs and chemicals during the past century. The data, as already mentioned, is far from complete. I have taken the articles quoted in a price list of 1810 and compared the prices quoted then and in 1824, 1844, 1854, 1866, 1872, 1886 and 1909 for the same articles. The results of these and similar analyses I do not in the meantime intend to disclose, but it will be of interest to state that a pharmacist in 1810 purchasing equal quantities of 155 drugs and chemicals paid, on an average, 11*s.* 6*d.* per pound, while the pharmacist of 1909, purchasing equal quantities of the same 155 articles, pays, on an average, 5*s.* 7*d.* per pound, or less than half the sum. It is necessary to point out that the mean value for 1810 and 1909, reckoning the actual quantities sold on an average throughout the country, (these figures I failed to get) may differ considerably from the two figures just given. The result is given for the purpose of showing that articles in common demand at both periods are on an average much cheaper in 1909. Such chemicals as phosphorus and nitrate of silver, and such drugs as extract of cinchona, extract of belladonna, opium, ipecacuanha and the oils of cinnamon, cloves and aniseed, show the greatest variability in market value. Most of the 155 articles quoted are good marketable commodities to-day.

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[1] As a readier means of recovering the duty, "Budget Stamps," intended to be affixed on articles affected, such as perfumery, have been put on the market by at least one enterprising firm. These stamps show to the public the increase in price of each article due to the extra duty imposed by the famous Budget of 1909.

(7) Prescribing—A Comparison, 1810 and 1909.

The character of prescribing in 1810 compared with that of to-day is of great interest. The physician of 1810 was a good prescriber, who not only considered carefully what ingredients he ordered together in one prescription, and therefore displayed knowledge as to the therapeutic action and value of the remedies then in vogue, but also very carefully wrote the prescription. Indeed, if I am to judge on the samples of prescribing of both periods which I have seen, I must give the first place to the prescriber of 1810. The striking difference between the two periods is the detachment shown by the earlier physician in considering what remedies he should order. Here are one or two examples taken at random :—

Die Jovis 5to Martii, 1806.

Mrs. Sarah Head.
℞ Pilularum galbani compositarum,
Aloes Socotrinae, ā ʒi.
Olei carui, guttae vi
Syrupi zingiberis fiant
Pilulae triginta Sume
Unam ter die vacuo stomacho.

Mrs. Middleton.
℞ Infusi gentianae compositi, ℥viss.
Tinct colombae, ℥iss.
Misce—Cape cochlearia duo ter quotidie.

Mr. Chaloner's servant.
℞ Myrrhae pulveris, ʒi
Kali praeparati, ℈ii
Ferri vitriolati, ℈ss
Tincturae colombae, ℥ss
Tincturae digitalis, guttae lx.
Aquae menthae piperitidis, ℥vii
Misce Cape cochlearia larga tria mane et vesperi phialo agitando.

In our capacity as pharmacists we observe the purposefulness of the prescriber in the foregoing prescriptions. These prescriptions are fair samples of what the apothecary of 1810 dispensed. At the present day there is no doubt an equal purposefulness and a greater knowledge of the therapeutical action of remedies in many cases throughout Great Britain. Unfortunately now, however, there is a considerable admixture with careful prescribing of slackness, inaccuracy and careless prescribing. We have unfortunately too many of the type—

Tablets No. 184,
Take as directed.
and Mist. Tonic,
Take as before.

The great development of medical work in other directions has led to a considerable extent to the neglect of the art of prescribing. It has been suggested that the necessity for prescribing scarcely now exists. Much of the skill employed by medical practitioners is directed towards prevention ; and, in the matter of treatment, the pill, the mixture, and the lotion are giving place to the serum, the vaccine, X-ray treatment, and the like. It is undoubted that the practice of medicine is being modified and extended in many ways by discoveries in the domain of bacteriology, parasitology, physiological chemistry and other sciences. But I am no believer in the cry that the necessity for prescribing is going. Rather do I see the necessity of its being extended and placed on a sounder scientific basis. The fact that medicine is now less empirical and is becoming more scientific in its practice, is not a valid reason for predicting the decay of prescribing. It rather would lead one to expect more scientific treatment. A brief consideration of the construction of the human body, keeping at the same time in mind that man is an animal, forces one to the conclusion that remedies both external and internal will always be necsssary—at least long beyond our time. The problem is in the end a biological one, and our experience in all biological phenomena is well summed up in the trite aphorism, *Natura non facit saltum.*

(8) EDUCATION AND EXAMINATION.

I should like to say something about the means of education of the pharmacist, and the examination he has to undergo prior to qualification. I have been for long deeply interested in these problems. Notwithstanding opposite opinions which have been expressed, I consider that the section of the new Act of 1908 empowering the Society to require evidence of training prior to examination a very important and necessary section, and one the adoption of which was one day inevitable, especially when we consider the course of evolution of the pharmacist. It is all the more satisfactory that the principle has been incorporated in an Act of Parliament which includes a practical solution of difficulties respecting the practice of pharmacy. But the principle of training prior to examination can surely stand on its own legs. It has been suggested to me that a mistake may be made in the direction of instituting too long a course and of recognising too few schools providing the instruction necessary—in short, of proceeding too hurriedly, without a due consideration of all the facts. I do not think this is at all likely to be true. The *immediate imposition* of a curriculum is neither contemplated nor called for. Prior to any curriculum which may in the future be imposed on students of pharmacy, we require to have reliable data as to available schools and colleges and as to the minimum course necessary for each subject. The Pharmaceutical Society has this matter in hand at the present moment, and no doubt in due course we shall be supplied with full information bearing on the curriculum to be adopted and the facilities for study throughout Great Britain. The compulsory curriculum of the future will be in the main the voluntary curriculum of to-day. The only difference will be that scrutiny will be exercised respecting the work done by the student of such a nature as to eliminate the possibility of inadequate study prior to examination. In the examination room evidence is given by the student as to the extent to which he has utilized his opportunities for acquiring knowledge. It is desirable that the Society should require the student to spend a certain reasonable length of time in a properly equipped place for the purpose of acquiring the necessary knowledge, of gaining the additional requisite training, and of laying the foundations, for the student, of habits which would lead to proficiency in the examination room and after he has left it, and of culture in after life. Our standard of examination, and the training requisite for attaining the standard, have been from time to time adversely criticized. It is said that the standard is far too high and out of all proportion to the duties which the pharmacist is called upon to perform in after life. Let us consider for a moment what a statement like this means. It cannot mean that the standard is too high for everybody. Does it mean that the standard is too high for all pharmacists, many pharmacists, or a considerable number of pharmacists ? Does it mean that, while the standard is certainly not too high for the dispensing pharmacist and the pharmacist engaged in the preparation of medicines, it is too high for the pharmacists whose fortune it is to be kept from the proper exercise of his calling, and who is driven by the struggle for existence to maintain a livelihood by side paths in pharmacy, such as the sale of packed goods of all sorts. If this is what is meant, then the answer is that the statutory body, the Council, cannot regulate the struggle for existence. Nor is it a board of directors of a syndicate controlling the practice of pharmacy, or controlling the income and expenditure arising from sales of medicine. There is a demand for a certain form of skill. The Pharmaceutical Society supplies the demand. The examined pharmacist takes the risk of failing to get proper employment. In Scotland and certain centres in England the pharmacist does have full opportunities of exercising his calling, and we are driven perforce to the remaining fact that owing to medical dispensing a number of our qualified men are not engaged for the full exercise of their skill. If it seemed likely that this state of things was to continue indefinitely, it might be advocated by some as a good reason for instituting a lower qualification, the holder merely selling poisons. If I were a pharmacist in practice in England, no matter what my own class of business was, I should never countenance such a proposal. I should instead be content to wait until such time as, by mutual co-operation with medical practitioners, dispensing would fall completely into the pharmacist's hands. The standard is not too high. The opportunities for full exercise of skill are too few to-day in industrial England. That is where the trouble lies. Examine for a moment the contents of the syllabus bearing on the qualifying examination. It amounts simply to this. The candidate must recognize and describe parts of well known medicinal plants, read prescriptions, know doses, know how to prepare and dispense medicines, and have an elementary knowledge of botany and chemistry, because these sciences are closely connected with his calling. His knowledge of botany and chemistry lead him to paths of culture, and specially relate to branches of these sciences closely connected with the practice of pharmacy. It would be a retrograde step for us to lower the standard of our examination because of the want of opportunities of many to practise, just as it would be a retrograde step for the General Medical Council to lower its standard, if it did so for the reason that many practitioners failed to practise medicine as they should do, or if the conditions for effective practice did not exist, which is undoubtedly the case in some districts.

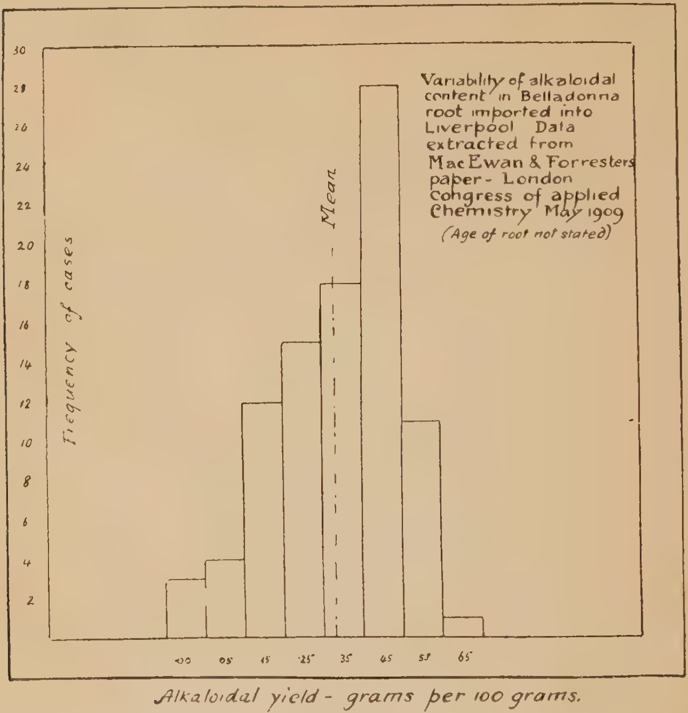
Having said so much which pertains to the interests of qualified pharmacists in their daily work, I should like to say something, before I conclude, bearing on pharmacy in its higher branches. Without doubt the great majority of members of the craft are engaged in the daily round of a retail pharmacy, but there has always been a considerable and indispensable section engaged in special technical work, in manufactures and in analysis and research. Increase of knowledge, proper equipment, and training in special branches are all important to members of this group. Noting the trend of events, it seems to me that the Major, the higher qualification, will be, in the future, confined to this group, and that few engaged in retail pharmacy will seek the honour. It is well to bear in mind that the standard of the Minor or qualifying examination is now somewhat similar to the Major examination in 1868. The retail pharmacist sees no advantage in spending time and trouble in acquiring the honours title, particularly since the public as a rule does not discriminate between the two. There are, of course, several examples in retail pharmacy in populous centres where, on account of the demand for such skilled service, it is to the interest and advantage of pharmacists to take the major diploma or a science degree. It is now more and more recognized that pharmaceutical chemists are becoming a special class engaged in scientific problems and not dispensers or retailers of poisons. The cry of " What is the use of the major ? " is an idle cry. The major diplomate has his place although he belongs to a class the members of which are few in number. Together with the ordinary science graduate or the pharmaceutical graduate, the major man supplies the demand, and that is all that can be said of the qualified pharmacist. If, from the point of view of economy, it should happen that the diploma should be merged in the qualification, there is still open to the pharmacist the means of getting special training beyond the requirements for qualification in the Society's School of Pharmacy and at the various universities. Even although few pharmacists in ordinary practice find it desirable or necessary to take the major diploma or a science degree, still it would be to the advantage of many to take post-qualification courses in special branches of work, such as bacteriology and optical technique and the like. It was my privilege to introduce to Scottish pharmacists in February, 1902, a proposal to approach the universities of Scotland with a view to inviting them to provide facilities for a University training suitable for pharmaceutical students working towards the qualifying examination, and with the further view of recognizing pharmacy as a profession by the institution of a science degree which would be open only to pharmacists. Now while, as a result of this, a science degree, open only to pharmacists, has been actually instituted in Glasgow and another in Manchester, a similar one in Edinburgh awaiting confirmation by the Privy Council, I recognize that up till now these facilities have not been taken advantage of to any great extent. This is due to two factors, which will soon be removed. The first is the natural diffidence to make a start on the part of those eligible. This is not confined to the pharmacy degree ; it has been noticed in all new degrees. The second is the most important factor. Up till now, and it may be for some time yet, we have a voluntary system of education prior to examination. Once a definite system of education is a legal necessity prior to examination the student will, in addition to his training at the schools of pharmacy in the subject of pharmaceutics, have most probably to take his botany and chemistry at a university or at recognized technical colleges and schools. The first part of the scheme of 1902 will then be realized. The connexion established between the student and the university is sure to lead the more proficient and those whose interest it is to acquire the knowledge, such as the works' chemist, to proceed to the science degree. At the present time, the professional man in charge of the manufacturer's laboratory is usually a pharmaceutical chemist or a graduate. In view of the great strides taking place in our branch, as in all branches of science, it is of the utmost importance that the special training necessary for the laboratory and the works should not only be continued, but extended, in every way likely to aid in the discovery of new compounds, and in their manufacture on a suitable scale, in order that British goods may keep their place in the markets of the world. These were my reasons then, and these are my reasons now, for advocating special laboratories in technical schools and in Universities equipped for pharmaceutical research, and for advocating the institution, in some of the universities at least, of a science degree suitable for pharmacists. Glasgow and Manchester are now open to the pharmacist, and I hope the day is not far distant when the special facilities granted will be taken advantage of by those for whom they were created.

(9) PHARMACOPŒIAL REVISION.

Early in the year the Committee of Reference in Pharmacy, appointed by the General Medical Council, reported to the Pharmacœpeia Committee the results of work done on the Pharmacopœia up to October 29 last. The recommendations appear on the whole to be satisfactory, although it seems to me that in certain directions the committee tends to go further than is desirable in a work issued by authority and used as a standard. Professor Greenish, on behalf of the Committee, has drawn the attention of pharmacists to the recommendations made, and has invited and received criticism. This method of courting criticism prior to publication is an excellent one, and is a new departure in pharmacopœial revision. It seems, however, to me to be desirable that the Committee should have gone even further than to invite, through the medium of the press, criticism on its work. A publication like the British Pharmacopœia cannot be the work of one man. It is not and never has been. It is the collected experience of scientific men in every department of science coming within its scope. It is because it is intended to be a work of collective experience that the General Medical Council has invited representative pharmacists to report their views to the Council. We as pharmacists must feel satisfied that the General Medical Council continues to take reasonable means of ascertaining our views respecting pharmacopœial methods and matter prior to the issue of the standard and guide which it is the privilege and legal duty of the Council to prepare and issue from time to time. It is, in my opinion, the further duty of the Committee of Reference in Pharmacy, not only to conduct experiments and to report thereon to the Council, but also, at the same time, to make an organized attempt to glean the experience of pharmacists generally and to invite capable investigators within their own ranks, but outside the Committee, to undertake definite sections of work, repeating what may have been done by the Committee, and, between them, covering the whole Pharmacopœia. It is because in the past we have had embodied the results of a few experiments of one person that inadequate formulae have appeared in former issues. It is no valid argument to say that pharmacists' monographs in various journals are studied, or that pharmacists have an opportunity, if they wish, of aiding by sending data and criticisms to the Committee. I could name two dozen and more capable pharmacists who could give invaluable assistance to the Committee of Reference in Pharmacy, if their services were enlisted in a systematic way on definitely stated problems allocated to them. Their data and experience could be collated by the Committee, and such as were deemed useful could be utilized in the Report to the Council. There is no publication within the wide scientific field or in the whole kingdom which, owing to its matter and its importance, is so well fitted for a scheme of co-operative investigation as is the British Pharmacopœia. It is satisfactory to note, in the Report, the recommended addition of a test for lead of so delicate a nature as that described. Lead is so frequent and so dangerous an impurity that the possibility of its presence should be completely excluded. The changes recommended with respect to tartaric acid, ether, aloin, aloes, liquid extract of cascara sagrada, collodion and most of the others are welcomed. It is desirable to know whether, in practice, the preparation named " acetum cantharidini " is likely to prove as effective as our present " acetum cantharidis." If so, there is every reason why the former should be adopted, for in the former we have a definite proportion of an active chemical substance of known composition, as against a variable proportion of active and inactive substances in the latter. The assay process for cantharis is a desirable addition. The data upon which the minimum percentage of cantharidin is based would be interesting and ought to be published by the Committee. The degree of precision of this and other methods of assay is an important factor to be borne in mind when the variability of the active content is being determined. It is very desirable that the limit of precision should be accurately known in each case where the natural variability of alkaloidal content is being studied. The natural variability in the proportion of the active constituents of plants has not yet been satisfactorily dealt with. It is true that the range is known with fair accuracy in the cases of aconite, belladonna, hyoscyamus, and even digitalis, but the frequencies of specific values are unknown, simply because a sufficient number of determinations of material under similar conditions as to environment and the like has not yet been made. It would be, in my opinion, a retrograde step to specify, except in cases where the variability in the content is demonstrated to be small, the percentage limits for active constituents of drugs. Let me give a concrete example. It is one of the recommendations of the Committee of Reference in Pharmacy to place dried belladonna leaves containing from 0·3 to 0·4 per cent. of alkaloid on the official list. Consider for a moment the known variation of English crops of belladonna leaves, both cultivated and wild. As low a proportion as 0·1 per cent. has been observed over a series of years. An assumed mean of 0·5 per cent. is given, but little or nothing is known as to the frequencies of the various proportions noted. We quite appreciate that environment affects the proportions found. How far selection is operating in the proportion of content has not been determined or even considered. It would, therefore, be unfair to give a definition which would lead to the rejection of plants and drugs generally whose proportion of active constituents fall below or above a propor tion quite empirically arrived at. It is unsound to insert limits of values, even after the true range, mean, and variability of the proportions are found, and the true nature of the distribution of active content determined. It is more scientific to specify the strengths in the various preparations, from the drug, the tincture, extract and so forth, since this proceeding eliminates all natural variations. The variations in the activity of certain toxic drugs were considered and pretty fully discussed at the recent meeting of the Pharmaceutical Chemistry Section of the Seventh International Congress of Applied Chemistry held in London in May. The London meeting was a great success, and the problem of variability seems to have been the feature of the Pharmaceutical Section. I trust that every assistance will be given by British pharmacists to further international inquiry as to the active principles of toxic drugs. The data already supplied to the Congress are valuable and suggestive. Take, for instance, the variability of the alkaloidal content of belladonna root as imported into Liverpool. In the accompanying diagram a graphic representation of the variability is given, which shows at a glance the wide range. A further analysis of the distribution of values in this series reveals the fact that the mean value is 0·339 per cent., while the most frequent value is 0·451 per cent. Other results flowing from the analysis are (1) that values above and below the mean are not equally likely to occur, and (2) that the samples do not appear to be drawn from the same areas, but from different areas at different periods, and quite probably the age factor affects the results—in other words, the material is not homogeneous. A long series of analyses of samples of each year's growth from the same areas would give a true measure of the natural variability of alkaloidal content. It is to be hoped that these and similar points will be carefully considered both by the Committee of Reference in Pharmacy and by the International Committee.

I should like to conclude my remarks on Pharmacopœial revision by saying that I hope I shall not be considered hypercritical by pointing out that in such minor matters as the use of the word "part" and the definition of the word "minim" precision of language is desirable. It should always be clear to the reader that either parts by weight or parts by measure is meant when "parts" are stated, and on more than one occasion it is not quite clear which is meant in the present edition. The student, also, who wishes to verify that a "minim" is the volume at

62°F. of "0·9114583 grain of water" must, after trial, look with admiration and awe on the chemist who makes such wonderful



weighings. An indication that this relation of volume to mass is arrived at by computation after observation rather than by direct observation would be more consistent with scientific method.

(10) Concluding Remarks.

The rapid development of chemical science in every direction has produced, and is producing to-day, a profound effect on the theory and practice of pharmacy. A quarter of a century ago we had already begun to perceive the reformation. The synthesis of alizarin, indigo and the innumerable colouring matters, together with the classical synthesis of conine, marked the new

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We are indebted to the Publishers of the *Chemist and Druggist* for the loan of the blocks illustrating the President's address.

departure—the onset of the revolution. In the domain of organic chemistry we see a great future for pharmacy and for much more than pharmacy—the human race. The synthesis of the sugars, the purine bases, substances of an alkaloidal nature, and innumerable other compounds, are steps forward to meet the physiological chemist, who is striving to reduce his empirical formulae for his series of organic substances to rational constitutional formulae, based on the same conceptions as those adopted by the organic chemist, and proved valid as guides by the only possible test, namely, that of experience.

A century ago John Dalton published the first volume of his *New System of Chemical Philosophy*, in which he propounded his atomic theory, a conception which has stood the test of a hundred years. Every day since, it has been tried by experiment and observation, by men of science who grasp its meaning. To-day it stands before the world the only medium whereby chemists convey the results of their work, and the only basis upon which they found other theories to describe the variegated phenomena of inanimate nature. To us, it all seems so simple that, almost forgetting the process of evolution, it seems as if it had always been part of the knowledge of mankind. But let us try to give a shorthand account of chemical processes without it, as the contemporaries of Dalton had to do, and we then see how far reaching, how important, how grand a conception the atomic theory really is. It is the basis of all the other theories in vogue in chemical science, and, without it, the fundamental "laws" have no existence. By its aid organic chemists are accomplishing that peaceful revolution the beginning of which we are the proud witnesses. By its aid we have been able to form a clearer conception of the composition of the earth's crust, which is everywhere at once so much alike and so different in detail. It was natural a hundred years ago to think of the atom as the one ultimate stable and indestructible unit, for all the experience of scientists led them to think of it as such. It detracts neither from the beauty nor from the validity of the atomic theory to proceed, as the result of experiment, to the conception that the atom, under certain conditions, disintegrates. Rather does it enhance the Daltonian hypothesis. The advent of the corpuscle or the electron seemed to some to mark the exodus of the atom. That could never be the view of any intelligent observer, for the fundamental conception of an electron is that it is either part of an atom or is operating on one. A hundred years ago Prout, without, however, the basis of observation Dalton had, formulated the hypothesis that all matter may be regarded as being derived from a primary substance like hydrogen. To-day, scientific men do not suggest that hydrogen is likely to be the primary substance—indeed hydrogen is viewed as being a complex. The conception of Prout was not supported by much experimental data. To-day, however, the experimental data point to the likelihood of Prout's conception being wrong in one respect only, namely, in the belief that hydrogen was the elemental substance. The brilliant researches of Thomson and his school lead us to hope that, in the electron, we shall be able to classify the results of our experience in chemical phenomena. But, if so, we must not jump to hasty conclusions, or make illogical statements to the effect that the electron really exists. It does exist, but only in conception ; so that we need not hope to be able ever to perceive the elemental unit. Just as with the atom, so much more so with the excessively minuter electron, must we *conceive* of its existence, and form a mental picture which will enable us to describe, in shorthand, our views of the phenomena we observe. The triumph of what we call mind over what we call matter is not a triumph due to our perceptive faculties. It is due to our powers of conception ; and, if our knowledge of chemical structure and physical phenomena has advanced with startling rapidity, it is because the physicist of to-day sees more clearly in his mind's eye the great picture of the inorganic world, of which space is the frame, time the canvas, and the electron the stuff which fills the canvas and makes the picture. This great picture which the physicist sees is none other than a picture of Nature. What Nature really is we know not and may never know. But it is something, nay, more, it is a great thing for us to see with trained eyes even a corner of the great picture which depicts to us how man views the earth and what man thinks of its contents—which depicts to us the experience which man has undergone during all the days and during all the years of his sojourn and of his labour on the earth.

VOTE OF THANKS.

Mr. N. H. Martin said the home-coming of the Conference to Newcastle was not without its sorrowful side. They could not help referring to the loss they had sustained in the death of Barnard Simpson Proctor, and there were other serious losses. Sixteen men had passed the presidential chair when the Conference was last at Newcastle, and of those sixteen twelve were alive, and five attended the Conference—Brady, Groves, Reynolds, Schacht, and Benger—names of which every pharmacist would be proud. To-day twenty-nine pharmacists had passed the presidential chair, and still there were only twelve alive, four of whom were in the room. He rose for the purpose of voicing their gratitude to the President for his able address. It was not allowable to criticize any statement or any theory advanced in the presidential address; it was not a paper to be criticized, and in this particular instance it was a communication from the "pope in pharmacy." He had put old truths before them in a very attractive guise, and he congratulated him on the skill and ability with which he had threaded the maze of modern difficulties. In the name of those who were present, as well as in the name of those members of the Conference who were not present, and in the name of pharmacists generally, he proposed a hearty vote of thanks be given to the President for his most interesting address.

Mr. JOHN SMITH (President of the Pharmaceutical Society of Ireland), in seconding the vote of thanks, said he was very pleased to have the opportunity of appearing as one of the representatives of the pharmacists and chemists of Ireland. Although they were not able to support the Conferences in very great numbers, he could assure them that the pharmacists in Ireland did take a very great interest in the work of the Pharmaceutical Conference, and they would read the address not only with the greatest interest, but with very great profit. He wished to convey to Mr. Tocher the gratification of his brother pharmacists in Ireland in seeing him in the presidential chair, and in thus having the hall-mark of pharmacy bestowed upon him.

The vote of thanks was carried with acclamation, and the President formally responded.

Mr. E. S. PECK then read the annual report of the Executive.

ANNUAL REPORT OF THE EXECUTIVE.

"The Executive Committee have pleasure in presenting their forty-sixth annual report.

"They have met on five different occasions and transacted the necessary business.

"The Research Sub-Committee commenced the work of revision soon after the last Conference, and the Research List was published early in January.

"Grants have been made to Messrs. Garnett and Grier for their research upon 'The Pungent Principle of Ginger,' Mr. H. Finnemore upon 'Cimicifuga Racemosa,' and Mr. E. W. Pollard upon 'Commercial Emulsions.' These members are communicating their results to this meeting.

"There still remains a considerable balance to the credit of the Research Fund, and the Sub-Committee would welcome applications for grants and suggestions for problems to be worked out.

"A Special Sub-Committee was appointed in September to consider what steps should be taken to improve both the numerical and financial position of the Conference.

"This Sub-Committee reported that it was considered advisable that the delegates appointed by the various local associations to attend the Conference should be officially presented to the President, and thereafter invited to participate in a discussion upon topics not necessarily scientific, but of interest to pharmacists generally. Two such discussions have been arranged for this year upon (*a*) 'Shall Dispensing be confined to Pharmacists?' and (*b*) 'Some Problems of the Poison Schedule.'

"This Committee also suggested that steps should be taken to reduce the cost of the *Year-Book* by making shorter abstracts of those papers which are of easy access, and that the financial year should run from January 1 to December 31.

"To enable members to have longer time in which to discuss the papers, and also to avoid an afternoon sitting, it has been thought expedient to transact some of the business of the Conference immediately after the luncheons on the Tuesday and Wednesday. It is hoped that members will assist the Executive in making this arrangement a success.

"The Committee learns with much regret that Mr. Edmund White wishes to relinquish his work as Hon. General Secretary. He has been mainly responsible for the publication of the *Year-Book* for the past six years, and the Executive wish to record their hearty thanks for the invaluable services he has rendered to the Conference during his time of office.

"The thanks of the Conference are also due to the Pharmaceutical Society for the use of their premises for Committee meetings, and to the Editor of *The Pharmaceutical Journal* for the reprints of the papers used in the discussions.

"Mr. J. O. Braithwaite continues to render his valuable services as editor, and our painstaking and efficient Assistant Secretary, Mr. J. Hearn, is now entering upon his tenth year of work for the Conference.

"The Committee is glad to be able to report that there has been no falling off in the membership during the past twelve months, and the Executive appeals to members to make individual efforts to assist them in increasing the usefulness of the Conference."

On the motion of Mr. J. P. KAY, of Aberdeen, seconded by Mr. C. E. STUART, of Newcastle, the report was adopted.

Mr. E. WHITE, in the absence of Mr. J. C. UMNEY, Hon. Treasurer, then presented the

TREASURER'S REPORT,

as follows :—

"I am glad to report that the subscriptions for the twelve months have been very satisfactory, being £338 against £279 in the previous twelve months, and with a reduced cost for the *Year-Book* of £10 it now places us in a better position than we have been for many years past. On July 1, 1906, there was a deficit of over £111. On July 1, 1909, there is a balance of over £5, and I have every hope that this will now be maintained. I believe that the modified arrangement for the subscriptions —falling due as they now will on January 1—will facilitate collection, and will not call for so many reminders on the part of the Assistant Secretary. I would like to remind the members that there is a considerable balance on hand in the Research Fund, and the Committee will be only too glad to receive applications for grants from it for research work."

Mr. J. R. HILL, in moving the adoption of the report, said it was not desirable that they should possess a large balance in hand ; it was sufficient that they had a favourable balance. He hoped that whatever economies it was found desirable to make would not diminish the value of the *Year-Book*. Another feature of the report was to the effect that there was more money in hand for research work than appeared to be wanted, and he hoped that research workers would come forward.

Mr. Giles seconded the motion, and the report was adopted.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1909.

The British Pharmaceutical Conference.

	Dr.	£	s.	d
1908.				
July 1.	To assets forward from last year—			
	Cash at Bank	101	5	8
	,, in Secretary's hands	1	10	8
1909.				
July 1.	To Members' Subscriptions received by Secretary	328	15	0
	,, Members' Subscriptions paid through Bankers	9	15	6
	,, Sale of *Year-Book* by Publishers	18	6	8
	,, Sales of *Year-Book* by Secretary	2	10	0
	,, Advertisements in *Year-Book*	75	0	7
	,, Liabilities on Open Accounts—			
	Butler & Tanner	119	16	5
	Assistant Secretary for Salary and Rent for one quarter, ending June 30	13	15	0
	,, Cheque not "cleared" through Bankers	2	0	2
	,, Bell and Hills Fund	21	13	2
		£694	8	10

Balance in hand, £5 14*s.* 3*d.*

	£	s.	d.
Viz.: Liabilities	141	5	10
Assets	135	11	7
	£5	14	3

1908. July 1. Cr.	£	s.	d.
y Bell and Hills Fund last year 1909.	23	1	8
, Expenses of *Year-Book* for 1908—			
Printing, Publishing, and Binding	189	1	4
Banding and Parcelling	2	1	1
Posting and Distributing	11	16	1
Advertising, £1 2*s.* 6*d.*, Publishers' charges, 1*s.*	1	3	6
Commission on Advertisements	18	15	2
, Editor's Salary	75	0	0
, Sundry Expenses—			
Assistant Secretary at Annual General Meeting	10	0	0
Assistant Secretary's Salary for one year to date	45	0	0
Rent of Office	10	0	0
Postages, £12 0*s.* 9*d.*; Editor, 15*s.* 10*d.*	12	16	7
, Printing and Stationery—			
McCorquodale & Co.	2	18	0
, Petty Cash	5	2	3
, Foreign Journals for Editor	4	1	6
, Bank Charges	0	5	2
, Liabilities of last year, since paid—			
Butler & Tanner	128	5	8
Assistant Secretary's Salary	13	15	0
, Cash in Secretary's hands	0	10	2
, Balance at Bank	140	15	8
	£694	8	10

The Bell and Hills Fund.

908.		£	s.	d.	£	s.	d.
ly 1.	To balance from last year	23	1	8			
	,, One year's Dividend on Consols	8	11	0			
					31	12	8
	By Kimpton's Account for Books				9	19	6
					£21	13	2

Assets—
In account with the British Pharmaceutical Conference.
£360 2½ per cent. Consolidated Stock.

The British Pharmaceutical Conference Research Fund.

1908.		£	s.	d.	£	s.	d.
ly 1.	To Balance				33	5	0
	By Grant to Mr. H. Finnemore	6	1	0			
	,, ,, Mr. E. W. Pollard	2	2	0			
					8	3	0
					25	2	0

Examined and found correct,
I. Bourdas,
W. Prior Robinson.
July 19, 1909.

List of Delegates.

Pharmaceutical Society.—Messrs. J. Harrison, Symes, White.

Pharmaceutical Society (North British Branch).—Messrs. Coull, Cowie, W. L. Currie, Giles, Sutherland, W. P. Wilson.

Pharmaceutical Society of Ireland—Messrs. John Smith (President), W. F. Wells.

Aberdeen Pharmaceutical Association.—Messrs. Craig, Giles, Hay, Kay, Jas. Paterson.

East Aberdeenshire Chemists' Association.—Mr. J. F. Tocher.

Bradford and District Chemists' Association.—Messrs. Hanson and Silson.

Cambridge Pharmaceutical Association.—Mr. E. S. Peck.

Edinburgh Chemists' Assistants and Apprentices' Association.—Messrs. Cowie, W. Duncan, J. Rutherford Hill.

Exeter Pharmacists' Association.—Mr. H. Wippell Gadd.

Forfarshire and District Chemists' Association.—Mr. Malcolm Macfarlane.

Glasgow and West of Scotland Chemists' Association.—Messrs. W. L. Currie, B. McMurray, G. L. Merson, J. W. Sutherland, R. Tocher.

Leeds and District Chemists' Association.— Messrs. Beacock, F. Pilkington Sargeant.

Liverpool Chemists' Association.—Messrs. W. P. Evans, Symes.

London.—Western Chemists' Association : Messrs. Martindale, Procter, Edmund White. *Public Dispensers' Association :* Mr. C. T. Rutter.

Manchester Pharmaceutical Association.—Messrs. Cleworth, C. A. Johnstone, J. H. Franklin, W. Griffiths Hughes.

Midland Pharmaceutical Association.—Mr. F. H. Alcock.

Newcastle Pharmacists' Association.—Coun. W. Atkins, Messrs. W. Buckley, T. M. Clague, J. W. Crake, T. C. Crawhall, R. Cubey, J. J. Dakers, J. I. Dakers, E. Dean, G. Foggan, J. Hall Forster, F. Gilderdale, R. Ismay, W. Kerse, R. McClumpha, H. W. Noble, F. Park, H. Pattinson, W. Pescod, A. D. Reid, W. R. Riddle, C. I. Russell, F. Schofield, R. B. G. Silversides, J. F. Simpson, A. Turnbull, J. F. Usher, G. Weddell, G. Whitehead, L. Williamson, R. Wright,

North Staffordshire Chemists' Association.—Mr. Edmund Jones.

Oxford and District Chemists' Association.—Messrs. Alderman C. Clayton, J. Dolbear.

Portsmouth Pharmacists' Association.—Mr. T. O. Barlow.

Sunderland Chemists' Association.—Messrs. J. Harrison, Hodgson, Ranken.

Wolverhampton and District Chemists' Association.—Mr. W. R. Dunn.

Worcester and District Chemists' Association.—Mr. John Twinberrow.

The reading of papers communicated to the Conference was then proceeded with.

SOME EXPERIENCES IN THE TESTING OF DRUGS BY BIO-CHEMICAL METHODS, WITH SPECIAL REFERENCE TO DIGITALIS, SQUILL, AND STROPHANTHUS.

By William Martin, M.A., M.D., (Durham).

The question of testing by physiological methods some drugs whose activity cannot at present be appraised by chemical means is one that has engaged the attention of manufacturing pharmacists for some years. It was first applied systematically for commercial purposes by manufacturers in America, but in more recent years, and particularly since an important paper on the subject was read before this Conference at its Brighton meeting in 1905,[1] manufacturers in this country have given the matter close attention. Although I am not myself a pharmacist, yet for the last twelve years my time has been occupied exclusively with the work of a manufacturing pharmaceutical house, and it seemed to me that opinions I have been able to form, based on practical work of the kind under consideration, in such a house might have some value for this Conference, hence my temerity in acceding to the suggestion that I should read a paper on the subject to-day. In considering this important matter, it has appeared to me desirable to draw a fairly sharp distinction between methods of testing suitable for demonstrating the activity of a drug in a manufacturer's laboratory, and others which are really elaborate pharmacological studies, more appropriate in the laboratories of a medical school, where men are taught to follow in detail the principal actions of a drug with the view of laying the foundation for a rational therapeutical use of it in the future. In this paper, therefore, I shall refer only to such points as seem necessary to establish a reasonable proof of activity in the drugs under consideration. Before proceeding to mention any particular drugs, I should like to say that when I speak of standardization in this connexion I do not mean to make a claim to that definiteness and narrow margin of error to which you, as chemists, are accustomed when you speak of standardization by chemical means. I do not think that such a degree of accuracy is attainable by bio-chemical methods of testing; the factors involved are too variable, however great the care exhibited in carrying out the tests.

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[1] Dixon, *Transactions of the Brit. Pharm. Conf.*, 1905.

CANNABIS INDICA

The drug is not apparently much used in this country, but that does not lessen the need for supplying an active preparation when it is prescribed. My method of testing it has been quite simple—viz., by oral administration to dogs, and noting the onset and duration of the inco-ordination of movement and other characteristic symptoms that develop with certainty to a more or less marked degree if the preparation is an active one. My practice is to administer in pill form 5 grains of the extract in divided doses, 3 grains being given at first and a further 2 grains after the lapse of two hours. An intelligent dog with fairly long legs, such as a fox terrier or an Irish terrier, answers well. Although the degree to which even the same animal is affected by similar doses at different times is by no means strictly uniform, it has been my experience hitherto that an active preparation will cause symptoms peculiar to this drug to develop without fail. Despite the fact that we have at present no chemical means of testing Indian hemp which can be considered satisfactory, there are points to which attention can be directed advantageously by the pharmacist. For instance, a small consignment of extract of Cannabis indica was recently delivered which contained about 34 per cent. of residue insoluble in 90 per cent. alcohol. It was not surprising that this extract failed to meet one's requirements. It happens that in every extract I have tested, where the insoluble residue has not exceeded 2 per cent., I have been able to elicit a characteristic physiological response. I am merely stating my experience. I do not draw a hard and fast inference that there is a necessary connexion between the two facts. Another point to which the pharmacist should direct attention in this drug, as in some others more important with which we shall deal, is the question of storage. It seems to me that Professor Marshall, of Dundee has shown conclusively that the chief cause of deterioration of Cannabis indica is oxidation of the active principle. You will have seen his note on the subject in *The Pharmaceutical Journal*,[1] but perhaps I may repeat his conclusion to emphasize my point:—"My experiments suggest that if these—and the remark applies more particularly to the extract and similar preparations —were put up in hermetically sealed vessels, and the vessels resealed each time after use, greater uniformity in the action of a particular preparation would be obtained."

ERGOT

This drug is in very extensive use by the medical profession throughout the civilized world on account of its recognized value in obstetric practice, and one which would seem to have baffled pharmacologist and chemist alike almost more than any other drug of first-class importance in the Pharmacopœia. I do not propose to do more than offer a few general remarks on the subject of this drug, and show you two blood-pressure tracings which I thought might be of suggestive interest. The tracings were obtained with preparations made from the same consignment of crude ergot, which was a good sample, such as a careful pharmacist would pass for use. Speaking with all respect for those who have published contrary opinions, I would like to say that I have not yet felt satisfied that there was sufficient evidence to show that a liquid extract of ergot, prepared with pharmacopœial methods from good sound ergot, is necessarily inert clinically because it fails to give a rise of blood-pressure in certain animals. Medical men, and especially general practitioners, who have probably the largest experience of it, in the main agree that in practical work good results are obtained with this official preparation, which is certainly the most commonly used of all the ergot preparations in the Pharmacopœia. A doubt then may arise as to how far laboratory experiments can be taken as a true guide to clinical value. The discrepancy, to my mind, is more apparent than real. In the laboratory the drug has generally been given, and the result recorded, under conditions differing widely from those which exist in clinical work. The pharmacologist tells us—and no doubt rightly—that the rise in blood-pressure which follows the introduction of this drug into the circulation is due to its power of exciting to contraction the plain muscular fibre in the walls of the smaller arteries, and that the resulting rise in the blood-pressure is a true index to the effect that would be produced on the parturient uterus. But, as a rule, in laboratory experiments the blood-pressure has been recorded after throwing a small quantity of the liquid extract of ergot, suitably diluted, direct into a vein; in such cases, as far as my own experience goes, a fall of blood-pressure invariably results, with a gradual return to the normal or a rise above it. The fall is doubtless due to the presence in this preparation of depressor elements in a sufficient amount to lessen materially, or perhaps completely neutralize, the rise that otherwise would take place. This result by no means proves that the same preparation given by the mouth, or even by intramuscular injection, would fail to exert to a helpful degree the characteristic action of ergot. But while saying this in defence of a preparation that has been administered with satisfactory results for so many years, I am bound to state also that there seems to me strong reason for doubting whether the official methods enjoined for the manufacture of the liquid extract of ergot are those best calculated to produce the most active preparation. My second tracing followed the intravenous injection of an experimental preparation, the result of an attempt to extract the most useful constituents from the drug and at the same time eliminate, as far as possible, the deleterious elements. In contrast to the other tracing, there was no fall, but an immediate prolonged and striking rise. These tracings are from two dogs treated on precisely parallel lines. They were completely anaesthetized by subcutaneous injection of morphine and atropine, followed by a little A.C.E. by inhalation; they were under natural respiration and with the nerve mechanism intact; the tracings were taken from the left carotid artery, and the injections made into the right jugular vein. I venture to think that the differences in activity disclosed—and this is not an isolated experiment—are sufficient to justify my belief that the official preparations of ergot need to be restudied from the pharmaceutical, pharmacological, and clinical points of view. If this were done systematically, and the results carefully co-ordinated, I feel confident that a great improvement could be made in them. It would not be too much to anticipate that a method of preparation would be evolved which would free the pharmacist from the unsatisfactory position of feeling that his best efforts may only result in a preparation of dubious value. Apart from the splendid work that has been done in recent years, and is still being carried out in the direction of the chemical isolation and physiological investigation of the many constituents that go to make up ergot, and which there is every reason to believe will lead in time to a full knowledge of its action, it does seem to me that there is immediate room for some less ambitious work directed towards giving us a preparation upon which greater reliance for consistently good results can be placed than on the most commonly used official preparations of the present time.

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[1] Marshall, *Pharmaceutical Journal*, March 27, 1909.

EPINEPHRINE

I know of no ordinary chemical methods of testing that give quantitative results of much value in estimating the activity of this interesting substance, and even qualitatively they are not nearly so delicate as observations made on the blood-pressure of suitable animals under certain conditions. Messrs. Gunn and Harrison's [1] ingenious identification test, in which the odour of phosphoretted hydrogen is developed, may prove useful to chemists in examining solutions claiming to contain this active principle, and on its presence being thus proved, additional confirmatory information would be gleaned by making use of the colour reactions, for I find that the green colour with ferric chloride solution and the rose pink with solution of iodine are well developed in dilutions of 1 in 500,000, and are seen even in dilutions of 1 in 1,000,000. The green colour vanishes quickly, but the rose pink with iodine is very persistent, being still quite evident after standing for twelve hours. To come now to the means of testing this principle by physiological experiments ; I do not propose to discuss the merits of the different methods of procedure that may be adopted for this purpose, but would rather lay briefly before you the one which I use myself, and I thought it might be instructive and interesting if I showed you lantern slides made from some of my actual kymograph records to illustrate what I have to say. Those of you who are already acquainted with the matter will see that my procedure is derived mainly from that excellent communication on standardizing suprarenal preparations which was presented by Dr. Isabella Cameron [2] to the Royal Society of Edinburgh on March 5, 1906. I adopted it, with slight modifications, later in the same year, and have continued to use it since. I rely on rabbits entirely, and they are anaesthetized with urethane given by stomach tube in the proportion of 1·25 to 1·6 grammes per kilo. of body weight; a little A.C.E. by inhalation is also given as required. I take the blood-pressure readings from a cannula in the left carotid artery, and make the injection into the right jugular vein. When all is in order, and the kymograph set going, I first take a short stretch of tracing to see that the record of blood-pressure is being produced clearly, and then, on a given signal, inject 0·5 c.c. of 1 in 1,000,000 solution of epinephrine. If the substance has been sufficiently purified, there follows at once a slight but quickly evanescent rise in blood-pressure. This result is constant. A small calculation will show you the extreme sensitiveness of the test. You will note the amount of epinephrine introduced is only 0·0005 Mgm. (approx. $\frac{1}{128000}$ grain). I may say here that this is the dose per animal. I do not vary it by the weight. My notes show that the rabbits used have varied (excluding an extra light one) from 1,450 to 2,900 grammes. We buy them from a dealer when they are about two-thirds grown, and use them after they have reached mature growth in our own animal house. In this way one is assured of getting healthy animals, with, presumably, therefore, arteries in the best condition to respond to a delicate stimulus. I next introduce 0·5 c.c. of 1 in 50,000—that is 0·01 Mgm. (approx. $\frac{1}{6400}$ grain) of epinephrine. The blood-pressure rises abruptly, is maintained at a high level for some seconds, and then gradually subsides. When the pressure has settled again to a constant level, I throw into the vein 0·5 c.c. of solution containing 0·65 Mgm. (approx. $\frac{1}{100}$ grain) of nitro-glycerin. The effect of this drug, as you know quite well, is to cause the blood-vessels to dilate, and consequently to produce a sharp fall of blood-pressure. This fall and the previous rise caused by the vaso-constrictor substance, should be approximately equal. I then wait until the blood-pressure again runs an even course, and, finally, throw into the vein at the same time injections similar to the two previous ones, so that there will be circulating with the blood two antagonistic elements, the one tending to cause a rise in pressure, the other having an equal and opposite effect, but there appears generally to be the following difference in their behaviour. The epinephrine would seem to begin to act a little ahead of the nitro-glycerin, but before a rise to any notable extent can occur the vaso-dilator comes into action and begins to produce a slight fall, but its action in turn is checked by the presence of the vaso-constrictor, the result being that neither can develop its characteristic change in the blood-pressure to any marked degree. The one practically balances the other. The above is what takes place with a reasonable degree of consistency if the substance being tested has been sufficiently purified. There are certain disturbing factors which need not be considered now, but the result, for all practical purposes, is quite good, and the epinephrine which will pass the tests laid down can be relied upon absolutely by the surgeon in his clinical work.

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[1] Gunn and Harrison, *Pharmaceutical Journal*, June 1, 1907.

[2] Cameron, *Proceedings of the Royal Soc. of Edinburgh*, 1906. Vol. xxvi., part iii.

DIGITALIS, SQUILL, AND STROPHANTHUS

Of these the most important is digitalis. That veteran pharmacologist and physician, Sir Lauder Brunton, in dealing with the therapeutical value of digitalis and its congeners, writes [1] :—" The most important drug of all in the treatment of heart disease is digitalis," and a much younger worker recently said in his enthusiasm [2] :—" In introducing it to the practice of medicine, Withering has proved to be one of the greatest benefactors of the human race." With such authoritative statements before us, and they could be multiplied easily, no apology is needed for weighing with scrupulous care the value of any suggestions made for the improvement of preparations of this and similar drugs, and the maintenance of as high a standard of uniformity in them as the nature of the case admits of. That there is a great variation in the therapeutic value of the preparations on the market of these cardiac tonics (especially digitalis and perhaps excepting strophanthus) would seem to be a fact as undeniable as it is disquieting, and in the present state of our chemical knowledge there appears to be no test applicable to the finished preparation that will give as true an indication of its activity as a direct observation of its reaction with living tissues—a bio-chemical test. Much has been done lately in the direction of deciding what form this test should take. My feeling is that it would be helpful at this stage if each worker put on record in a candid way his method of procedure and results. When such information is once made available by suitable publicity, independent investigators will have an opportunity of repeating the methods or suggesting others, and so a general body of agreement will be developed upon which in course of time a final expression of opinion can be made. I have studied carefully all the literature I have met with in recent years bearing on this subject, and it seems to me that the most suitable method for practical guidance in connexion with a manufacturer's laboratory, and one which gives as good results as any others advocated, is that which requires that a fatal termination shall follow within a certain time-limit of the administration to a small animal of a fixed dose of the preparation to be tested. In deference to the published opinions of prominent pharmacologists, and knowing how greatly our knowledge of these drugs has been increased by the study of their action on the heart of a frog, I selected frogs as the animals most suited for my purpose when, a few years ago, I began to do this work. My experience has been limited almost entirely to their use, and I propose to lay before you as concisely as possible my method of applying the test, some of its limitations and anomalies, the information gained, and my opinion of its value.

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[1] Brunton, *Therapeutics of the Circulation*, 1908, p. 143.

[2] Sharp, *Proceedings of the Royal Soc. of Medicine*, 1909. Vol. ii. No. 7, Therapeutical and Pharmacological Section.

There are certain manifest precautions that should be observed in selecting any animals for tests of this kind, and there are special points in the life history of frogs that make it even more important with them than with warm-blooded animals to exercise care in this direction. As far as possible, frogs should be chosen of uniform vigour, weight, and species. It would possibly be better also if only males were used, but this is a matter of less consequence in the summer months. During the spawning season it would lead, quite evidently, to incongruous results to make use of the females, and at this time, too, I would not use males unless they had been segregated. Broadly speaking, the yearly life of the frog may be outlined as follows :—In the summer and early autumn the animal enjoys its fullest measure of physical activity ; as autumn goes on it becomes less active, and, gradually, with the approach of winter, sinks into a lethargic condition, which lasts until early spring, when the animal again wakens to vigorous life, and utilizes its new-born energy for reproductive purposes ; by the end of April or May the cycle, as sketched, will be complete. Taking this as, roughly, an accurate statement, it is not surprising that the figures I shall bring before you show a marked difference in the time or dose required to kill at various seasons of the year. My attempts during winter months to lessen this difference by keeping the animals in a moist atmosphere at average summer heat for a few days before testing have not met with much success. Whilst disclaiming any special knowledge of natural history, I cannot help but think that the phenomenon of hibernation represents a periodical change in constitution of too special a character to be accounted for simply by change of temperature. My experiments on the lethal doses for small, warm-blooded animals have been so few that I will make no detailed allusion to the subject. There is the less need to do so since, in my opinion, information drawn from frog tests can be utilized to carry us through the year.

Suppose now that we are about to test a preparation from one of these cardiac tonics at the most favourable time of the year for the purpose—that is, in June, July, August, or September. Five specimens of the common frog of apparently equal vigour are selected, preferably a series between 15 and 25 grammes weight and with as little difference as possible between the weights of the individual frogs comprising it. The animals are weighed carefully, and the weight of each marked on a small tablet which is tied loosely to one of its hind legs. They are placed in a glass receptacle about 10 ins. deep, or one with a loosely fitting cover, a little water being put at the bottom of each vessel. The preparation to be tested is carefully diluted in a fixed proportion, and the standard dose per 20 gramme of frog weight is calculated for each animal according to its weight. The syringe used to make the injections is accurately graduated in minims, or fractions of a cubic centimetre, and fitted with a very fine needle—a most important point. A microscope with a $\frac{2}{3}$ objective is set out ready for use. The animals are then injected one after another each with its appropriate dose, the times noted and the animals kept under general observation. The injections are made into the dorsal lymph sac, the greatest care being exercised to see that, if possible, not a drop of the injected fluid returns through the puncture in the skin. In the course of a short time it will be seen that some of the animals are not sitting up in the perky way so characteristic of the frog, but the head droops forward and the legs are splayed out unsymmetrically. On pinching a foot the animal will draw up its leg quickly, and perhaps even spring out of the dish, but gradually it gets more helpless, and finally fails to respond to any external stimulus. The web of the foot is then examined with the microscope to see if circulation has stopped. Although the reflexes have become completely lost, there may still be some movement of the blood in the larger vessels. When this has ceased the animal is considered dead, and the heart carefully exposed to see what condition it is in. If the "end reaction" has been typical, the ventricle will be found firmly contracted, white and motionless, this is an essential feature of the test; the auricles will be purple, engorged, and generally also motionless, but a few feeble and intermittent beats may continue for a short while. The time is now again noted down. The probabilities are that the time to kill in this typical way will be different for each animal under observation, but that all will be dead within two hours. I have given this outline of procedure for a reason which will be intimated at the close of this paper; and, if I have made myself clear, it will be seen how simple and straightforward the method is. This manner of proceeding applies to the whole of the preparations made from the group of drugs under present consideration, but I shall base my further remarks only on the tinctures, as it seems to me better to deal with the subject thus than to complicate it by referring to the many other official preparations that are made. The dosage used in testing all the others is simply proportional to the amount of crude drug they contain respectively by comparison with the tincture.

The standards, coming under my notice, that have been suggested for testing these drugs are not by any means uniform, and in order to have a clear idea of their relation to each other I have worked out figures to indicate the doses that would be used for a frog of 20 grammes weight if all the preparations were tinctures of the British Pharmacopœia. The following table brings out this comparison clearly:—

STANDARDS THAT HAVE BEEN SET UP FOR DIGITALIS, SQUILL, AND STROPHANTHUS.

The figures have been calculated throughout to show the approximate doses for:—

B.P. Tinctures and 20 gramme frogs.

EDMUNDS AND CUSHNY[1]:—

Digitalis.—A dose between 4 and 1$\frac{3}{8}$ min. (0·24 to 0·08 c.c.) should kill a frog between 15 and 20 grammes in 1 hour.

DIXON:—

Digitalis.—2½ min. (0·15 c.c.) should kill in 1 hour.

Squill.—The same; but *Strophanthus* always more toxic.

DIXON AND HAYNES:—

Digitalis.—2½ min. (0·15 c.c.) kills in 66 minutes.

Squill.—2½ min. (0·15 c.c.) kills in 100 minutes.

Strophanthus.—$\frac{3}{10}$ min. (0·018 c.c.) kills in 48 minutes.

HAYNES:—

Confirms Dixon and Haynes, but extends time limit to 3 hours.

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[1] Edmunds and Cushny, *Experimental Pharmacology*, March 18, 1905, p. 123.

Houghton (confirming his work of much earlier date):—
Digitalis.—4 min. (0·24 c.c.) should kill within 12 hours.
Squill.—2 min. (0·12 c.c.) should kill within 12 hours.
Strophanthus.—$\frac{1}{10}$ min. (0·006 c.c.) should kill within 12 hours.

It is seen that Professor Dixon [1] suggested at first a one-hour time-limit; later, in conjunction with Dr. Haynes,[2] he raised the time-limit to a period longer than one hour for digitalis and squill; writing very soon afterwards, Dr. Haynes,[3] confirmed these standards for dose, but would seem to have extended the time-limit to three hours. Dr. Houghton,[4] in a paper published in the *Lancet* of June this year, where also he gives full references to his many communications of earlier date upon this subject, describes his method of procedure, which varies from the others in many ways. His doses for digitalis and squill seem large for a time-limit of twelve hours, and that for strophanthus seems to suggest a toxicity relative to digitalis and squill greater than has generally been accepted, but I do not know to what extent the extra time-limit would affect this matter.

Following the practice of English writers, I have used what may be called the "quick-kill" standard, and my own application of it may be set forth as follows:—

Standards used by Wm. Martin.

Tinct. Digitalis, B.P. { April to September against time
Tinct. Scillae, B.P. { October to March against standard
with 2½ min. (0·15 c.c.) per 20 grammes in three hours, of five frogs all must be markedly and typically affected, and a majority must be killed.
Tinct. Strophanthi, B.P.
½ minim (0·3 c.c.) per 20 grammes in two hours.
The general notes above otherwise apply.

For the tinctures of digitalis and squill, 2½ minims (0·15 c.c.) per 20 grammes of weight are injected. Five frogs are used for each test. All must be markedly affected, and a majority must be killed in typical fashion within three hours. Any surviving at the end of three hours should be pithed and the heart exposed; a drop or two of the preparation being tested let fall upon it will quickly bring it to a standstill in the systolic phase. For tincture of strophanthus, I require that ½ minim (0·03 c.c.) per 20 grammes of frog weight shall kill within two hours, and the same general comments given for the other two tinctures apply here, the heart being exposed at the end of two hours, after pithing, if any have survived. The figures I shall give you show that these standards are not too stringent for the months of April to September inclusive, and my experience is that if the months of June, July, August, and September alone were taken, the time-limit given might be reduced substantially.

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[1] Dixon, *Brit. Pharm. Conf.*, July, 1905.
[2] Dixon and Haynes, *The Medical Magazine*, January, 1906.
[3] Haynes, *The Bio Chemical Journal*, January 27, 1906.
[4] Houghton, *The Lancet*, June 19, 1909.

I have already referred to the seasonal variations of activity in these animals, and this presents a difficulty which makes reliance on a time-limit most fallacious when dealing with the animal during the dormant season and immediately before and after it. As indicated above, the year can be divided conveniently into two halves, April to September and October[1] to March, special care being taken in selecting the animals to be used in the earlier months of the active season. The following table shows the effect of this seasonal variation, the tests being in all other respects parallel.

SEASONAL VARIATIONS.

Name of B.P. Preparation.	Average Time to Kill.	
	April to September.	October to March.
Tinct. Digitalis . . .	110 minutes	Many survivals
Tinct. Scillae	102 minutes	173 minutes
Tinct. Strophan . . .	74 minutes	182 minutes

For the October to March period reliance can be placed on the proved keeping power of the crude drug and care in making the preparation, or, what is better, a standard can be set up each August against which preparations can be tested in the months less favourable for the application of this method. The time-limit would then be disregarded and the trial preparation deemed active if it killed a series of frogs of similiar physical characteristics as quickly as the standard killed a match series. There is another point which ought to be mentioned here that I have not had time to go into for this paper. It is the probable variability in the rates of absorption of dilutions of the different tinctures and the effect of this on the time required to kill.

There is also a marked difference in the effect produced on individual animals under conditions of poisoning by these drugs as closely identical as one can make them. To illustrate this variation in individual response, I have compiled two tables which show up the point in a graphic way.

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[1] October: No experiments were performed during this month, and it is, therefore, quite possible that it would be more correct to class October with the active months.

Varying Times taken to Kill Frogs of approximately Equal Weight injected at the same Time with the same Preparation in Standard Doses.

Tinct. Digitalis.			Tinct. Scillae.			Tinct. Strophant.		
Weight in Grammes.		Time in Minutes.	Weight in Grammes.		Time in Minutes.	Weight in Grammes.		Time in Minutes.
15·4	=	80	18	=	80	16·7	=	60
16	=	55	21	=	68	17	=	60
19	=	74	19·5	=	126	20	=	87
20	=	48	19·5	=	85	20	=	98
20·25	=	90	19	=	114	20	=	112
20·25	=	133	21	=	180	23	=	78
21	=	109	23	=	62	20·1	=	65
21	=	86	21·6	=	75	22·2	=	75
21	=	89	35	=	100	28	=	95
22·5	=	108	35	=	70	28	=	105

I took from my note-book records of fifteen pairs of frogs killed by the tinctures under consideration. The two making each pair are about the same weight, and each pair was from a series killed on the same day under identical conditions. The figures, in my judgment, are a reasonable proof that the individual factor is a variable quantity, sufficiently well marked to make it unwise to draw too precise conclusions from the assumption that there is a uniform reactivity for a given weight of animal. Recently, in testing squill and strophanthus, I obtained the interesting results shown on the next table, which are a further confirmation

Table showing Results of Injecting Frogs of Different Weights with Equal Doses.

Standard for Tinct. Scillae B.P. 2½ minims (0·15 c.c.) per 20 grammes.			Standard for Tinct. Strophan. B.P. ½ minim (0·03 c.c.) per 20 grammes.		
Weight in Grammes.	Dose of Tr. Diluted 1 in 4.	Time to kill in Minutes.	Weight in Grammes.	Dose of Tr. Diluted 1 in 10.	Time to kill in Minutes.
14	7½ minims	Survived	16½	4⅘ minims	80
14½	Do.	136	17½	Do.	88
14½	Do.	141	17½	Do.	88
15½	Do.	106	19	Do.	92
16½	Do.	83	19	Do.	92

of the view just expressed. It will be seen that in each case five frogs of varying weights were injected with the same amount of tincture. In the strophanthus series the deaths occurred to rule—that is, the lightest frog succumbed first, the heaviest last, and the intermediate ones went down in order of weight. In the squill series exactly the reverse took place, and the lightest frog actually survived.

Account must be taken of the possibility of irregularities arising from errors of experiment, but these will be few and small with a careful worker.

I have mentioned these anomalies, not with the aim of disparaging this method of testing; for, on the contrary, considerable experience has made me form a very high opinion indeed of its value, but because it is necessary to take even closer account of difficulties than of straightforward successes when attempting to arrive at a just estimate of a comparatively new line of work.

I should like now to lay before you some useful pieces of information gleaned in the course of work of this kind in the past three years. Some of it only confirms what others have already found, and some of it may be fresh to you. It seemed to me important to form some conclusion, as far as the duration of time covered would allow, on the question of the keeping power of these drugs and the tinctures made from them. To take digitalis first, there seems to be no doubt that leaves properly collected and dried and then stored under suitable conditions will retain their activity for many years, and if special precautions are taken they would seem not to deteriorate at all. I have myself proof of activity extending over nearly two years. Leaves collected in the autumn of 1907 were tested in April, 1908. The average kill of the tinctures was ninety-nine minutes, and a tincture made from the same leaves on June 21, 1909, gave an average kill of ninety minutes. But these figures do not give the limit of keeping power by any means. Dr. Gordon Sharp[1] has recently stated that leaves eight years old, supplied to him by Mr. Holmes, of Bloomsbury Square, retained their full activity, and, further, that leaves which had been in his own possession for eleven years still gave the typical reaction of this drug when tested on the frog. I have been able to satisfy myself that the tincture of digitalis retains its activity for nine months or a year or even more. It is quite safe to say that no appreciable loss occurs up to nine months. As regards squill, I have no note of a longer period than about a year for the crude drug, but it was quite active at the end of that time. The impression made on my mind by testing old samples of tincture of squill is that this preparation begins to lose its activity rather sooner than tincture of digitalis, but retains some degree of potency for a much longer period. For example, preparations made in 1908, 1907, 1906 and 1905 all showed distinct evidence of activity when retested this year, whereas the preparations of digitalis of two years and over were practically inert. I have no record of having tested strophanthus seeds more than a year old, and these were active. The tincture of strophanthus, as you already probably know, retains its activity unimpaired for many years, and is, in this respect, in striking contrast with the other members of this group. A short table of results in support of this statement may be interesting.

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[1] Sharp, *Proceedings of the Royal Soc. of Medicine*, 1909. Vol. ii. No. 7, Therapeutical and Pharmacological Section.

TINCTURE OF STROPHANTHUS.

Year made.	Average Kill.	Year retested.	Average Kill.
1906	60 minutes	1909	87 minutes
1907	108 minutes	1909	74 minutes
1908	54 minutes	1909	87 minutes
1909 (May)	102 minutes	1909 (June)	88 minutes

May I ask you to bear with me a few minutes more, that I may state some general conclusions at which I have arrived in considering the subject-matter of this paper ? If some of the opinions that have been expressed in recent years were to be accepted in their entirety as strictly justified, one might see cause for much discouragement in the practice of pharmacy. But my own experience, as I have tried to indicate, shows that the pharmacist ought rather to find in these researches an inducement to display yet greater care in the selection and storage of his crude drugs, and the making, keeping, and improvement of preparations from them. If the general pharmaceutical knowledge that is available at the present time were always fully utilized, I cannot help but think that we should hear less of inactive galenical preparations. I should like also to refer to the idea, which seems to be gaining ground, that some tests of a bio-chemical nature should be included in the Pharmacopœia. As I understand the matter, it would be a departure from the principles [1] that have hitherto actuated the compilers of this book to include methods that could not be carried out by the pharmacist himself. It does not seem, however, to have been seriously suggested that any tests other than some suitable ones for the cardiac tonics should be included. My own impression is that the time is not yet ripe for the introduction of tests of this kind, unless, indeed, they were made permissive and not mandatory. If it were decided that the "frog test" was the most generally satisfactory method of estimating the therapeutic activity of these drugs, I think it could be included without departure from the principles of selection just referred to, inasmuch as these tests are of such a kind that they could be carried out quite well, and with perfect propriety by men who are trained in the art of delicate manipulation and scientific observation. It is because I have formed this opinion that I referred in some detail to my method of applying these tests, and it is obvious that any of you could carry them out with perfect ease; and, further, there ought to be no insuperable difficulty in obtaining a modification of the existing law regulating experimental work of this kind to the extent of making it possible to grant to pharmacists and other suitable persons, under proper safeguards, a licence to carry out these particular tests.

It will be readily understood that a considerable amount of practical experimental detail must lie behind even a general communication like this, and that such work cannot be carried out without skilled assistance. I would not like, therefore, to sit down without definitely acknowledging my sense of indebtedness to my friend, Mr. Binks, for his ever ready and able help, and to others with whom I have the advantage of being associated for many useful suggestions.

Discussion.

The President, in opening the discussion, said they were very much indebted to Dr. Martin for his exceedingly interesting and very original contribution. Bio-chemical methods were of the greatest importance to medicine, although, of course, at the present time they were outside the sphere of the pharmacist.

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[1] Tirard, *Proceedings of the Royal Soc. of Medicine,* 1908. Vol. ii. No. 1, Therapeutical and Pharmacological Section.

That was a disadvantage to the pharmacist, especially in the case of digitalis, squill, and strophanthus. It was the practical utility of the drug that was of importance to the medical practitioner, while the chemist, on the other hand, desired to know the chemical constitution of the substances he prepared. He thought they, as pharmacists, ought to study the physiological activity of drugs more, and he was not quite sure that he would not be prepared to advocate the inclusion of certain physiological tests in the Pharmacopœia. But they had to bear in mind that the British Pharmacopœia was not the production of pharmacists. It was under the control and direction of the General Medical Council. It was within the powers of the General Medical Council to introduce such tests, and if such tests were introduced it might be possible for the pharmacist with a little training to carry them out in his laboratory.

Mr. PECK, in moving a vote of thanks to the reader of the paper, said as one of those who were mainly responsible in getting Dr. Dixon, of Cambridge, to read his paper before the Conference at Brighton, he was very pleased to take that opportunity of moving a vote of thanks to Dr. Martin. He had been very interested to hear Mr. N. H. Martin say that he only wished for one alteration in the constitution of the Conference, and that was that one word be added, that of "activity" as well as "purity." As Dr. Martin had mentioned Dr. Haynes in his paper, it had occurred to him that it would be well to see Dr. Haynes and ask him if he would give him some of his experiences. He had done so, and Dr. Haynes had sent him the following, which he thought would probably be useful :—"My friend, Mr. E. Saville Peck, has very kindly offered to communicate to the Pharmaceutical Conference some of our experiences in the Cambridge Pharmacological Laboratory in the testing of drugs by bio-chemical means. I am very much indebted to him for giving me the opportunity of so doing. It is now over four years since I commenced this work, and having examined many preparations from several firms of manufacturing chemists, I am more than ever convinced of the necessity of some kind of physiological standardization in the case of those galenicals which cannot be assayed by chemical processes. I have come across specimens of extract of ergot and preparations of the suprarenal glands which had absolutely none of the usual effects when tested experimentally ; and many samples of the tinctures of digitalis, squill, and strophanthus have been found to give reactions considerably below those conforming to our arbitrary standard. And here I would mention my complete agreement with Dr. Houghton in his plea for international standards. We are sometimes told that our methods are crude and inexact; that the frogs should be themselves standardized, and that the action of drugs on the lower animals is in no way comparable to that on man. But surely we can say whether a certain preparation has any action at all, and can compare it approximately if not exactly with a standard preparation. I will now briefly refer to a few points which I think may be of interest. In the case of Indian hemp we find that cats respond very nearly as well as dogs, and give the usual symptoms after the administration of an active preparation. African and American hemps are not nearly so toxic as the Indian variety. There is no doubt that the activity of a specimen of ergot can be well and justly estimated by observation of the effect on blood-pressure. This has been proved by control experiments on the isolated uterus, pregnant and unimpregnated, of cats and rabbits. The recent work [1] of Drs. Dale and Barger in isolating and identifying the chief blood-pressure raising active principle of ergot is extremely interesting and valuable, and throws much light on the notorious variations found in the commercial liquid extract. In my experience it is impossible to tell whether a specimen of ergot is active or not by the naked eye, or from a knowledge of its place of growth, transport, etc. The only reliable method is to submit a sample from bulk to physiological experiment. It seems clear that the most active specimens come from Russia."

"With regard to the group of cardiac tonics, we estimate the activity of specimens by determining the least quantity which will cause the death of frogs of known weight by arresting the heart in systole within two hours. The result is expressed in minims or cubic centimetres per 100-Gm. frog. Thus our standard for a reliable tincture of digitalis or squill is this:—That the minimum lethal dose for 100-Gm. frog is not more than 0·74 c.c., or 12½ minims. Tincture of strophanthus, as I have urged before, is very much more toxic than the tincture of either digitalis or squill, although the pharmacopœial dose is the same. Our standard is that the M.L.D. be not more than 0·06 c.c. or 1·47 minims for 100-Gm. frog. The frogs should be freshly caught males, and as many as two dozen may be required for each specimen before the minimum lethal dose can be estimated. Our time limit is two hours, for it is quite exceptional for a frog to succumb if he survives the injection for that period. Before injection the tinctures of digitalis and squill are diluted with an equal quantity of frog's saline solution ; tincture of strophanthus is diluted 1 in 12 for the greater exactitude of dosage. There is no reason why the second-year leaves of *Digitalis purpurea* should be specially mentioned as being the best. I have on several occasions found that the first-year leaves are quite as active, if not more so. The leaves retain their activity for many years, as pointed out by Dr. Sharp, if kept in well-sealed vessels. The tinctures of digitalis are found to begin to deteriorate twelve months after preparation, and should not be dispensed after being that time in stock."

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[1] *Proceedings of the Physiological Society* May, 15, 1909.

Dr. SYMES seconded the vote of thanks, and said it was interesting to find Dr. Martin obtaining such constant and satisfactory results when dealing with reliable samples of drugs and tinctures. He thought it pointed to the fact that pharmacy was quite up to date as compared with physiology. The suggestion that those tests might possibly form part of the next Pharmacopœia was one which one wanted to think a great deal about before deciding. In the first place, though they were highly satisfactory so far as they go, and experimentalists were apparently making great progress, he did not think that the consensus of opinion amongst them was that they had arrived at such satisfactory results as to justify them making it a compulsory test, because a pharmacist might be liable at any time to be called up before the magistrates on the ground that his tincture did not quite cause the amount of blood-pressure the Pharmacopœia prescribed as applicable to that particular preparation. He thought they ought to have very satisfactory and very uniform results before they arrived at that point. One thing they ought to strive for was that pharmacists should constitute a portion of the Pharmacopœia Committee. That was a point they had been striving for for years, and he hoped some day it would be attained. They were exceedingly indebted to Dr. Martin for the ready manner in which he had come forward at such short notice. They were also desirous of listening to anything which would add to their knowledge of the means of obtaining the best possible medicines for the treatment of disease.

Mr. RUTHERFORD HILL said that recently there had come under his notice the fact that a fluid extract of ergot, prepared from good ergot with great care, was condemned as inert by the pharmacologist when tested by blood-pressure. When tested by its action on uterine muscle it was found quite efficient. Light was thrown on this by Dr. Goodall in the *Edinburgh Medical Journal* for July, where he found that there are apparently pressor and depressor constituents in ergot, which vary in proportion and may neutralize the blood-pressure reaction of a liquid extract, which nevertheless acts quite characteristically on uterine muscular tissue. This latter, he therefore suggests, is the only reliable bio-chemical test. But it is not nearly so convenient as the blood-pressure test. The pressor and depressor constituents have not yet been clearly determined, but the line of research may be directed to a process for liquid extract which will eliminate the depressor constituents, so that the blood-pressure test for pharmacological activity may always be relied upon. These bio-chemical papers suggested the addition of biology to the pharmacists' curriculum, as suggested by Professor Trail.

Mr. H. W. GADD asked Dr. Martin whether he had found any relation between the content of strophanthin in strophanthus and the physiological effect on frogs. He had noted two cases where the relation was very close. In the first the strophanthin content was 0·482 per cent. and the minimum lethal dose for 100-Gm. frog 0·75 minim; in the second the strophanthin content was 0·235 per cent. and the minimum lethal dose for 100-Gm. frog 1·5 minims; so that where the strophanthin was approximately double the minimum lethal dose was exactly a half. The total solid residues of the samples did not differ very much, so that evidently such residue was no criterion of therapeutic activity.

Mr. N. H. MARTIN said they were indebted to Mr. Peck for securing that contribution of Dr. Haynes, but he (the speaker) would not like to accept Dr. Haynes' *ipse dixit* that Russian ergot was superior to Spanish. He had had an experience of some thirty years of manufacturing from Spanish, and he had manufactured hundreds of gallons and had always found it very active. He believed the pharmacist who was careful in the selection of his drugs would always get active preparations, but if he used ergot which had been put on the market because it would not keep any longer, then he might get variability. If the ergot was selected carefully and preparations were made from new Spanish ergot the clinical evidence was that they would always get an active preparation.

Mr. E. **Brier** said one argument might be added in favour of physiological standardization. Where would we have been with regard to anti-diphtheritic serum were it not for this method of estimating its strength? It must be admitted that serum therapy would be impossible without physiological standardization. Furthermore, according to Dr. Houghton's paper in June before the International Congress of Applied Chemistry, two samples of strophanthin chemically identical were found on physiological test one to produce ninety times the toxic effect of the other. With regard to the proposed physiological standards, in these days of cross-Channel flights and five-day passages across the Atlantic we wanted more than national standards, and Dr. Houghton, who spoke after fifteen years' experience of physiological standardization, suggested the adoption of international standards for heart tonics similar to that adopted for antidiphtheritic serum.

Dr. **Martin**, in replying, thanked the members for the kindly way in which they had received the paper. Continuing, he said the suggestion at the end of his paper put forward the possibility—he was not prepared to recommend it strongly—but put forward the possibility of there being included in the Pharmacopœia not biological tests generally, but only those for the digitalis series. He thought it would be quite impossible for pharmacists with the present training they had to undergo to contemplate the carrying out of tests involving the action of ergot on the uterus and the blood pressure. The tests he had given for the cardiac tonics dealt with could be carried out perfectly, and they afforded as good proof of activity as any other tests that had been put forward for the examination of the digitalis series. Mr. Rutherford Hill spoke about the depressor elements in the liquid extract of ergot; he (the speaker) had touched briefly on that subject in the body of his paper, and quite recently he saw that Dr. Goodall had been referring to the same point. He hoped to have the pleasure of reading that communication in full. Mr. Gadd asked him whether he had made any definite observations in relation to the strophanthin content and the physiological tests; he had not. All his notes had been based on the tincture of the Pharmacopœia. Tincture of strophanthus was an extremely constant preparation, and was far better than any others of the digitalis group in that respect. He had no comments to make on the suggestion as to whether serums should be introduced into the Pharmacopœia or not. That was rather beyond the scope of his paper.

THE ESTIMATION OF EXTRACTIVE AND GLYCERIN IN SPIRITUOUS GALENICALS.

By W. A. H. Naylor, F.I.C., and E. J. Chappell.

Early in the year we published the details of a process for the determination of glycerin in spirituous galenicals. Latterly our attention has been directed to the estimation of the extractive in similar preparations. A careful search through chemical literature shows that little work in this direction has been recorded. To our knowledge, the only suggestion of value is that put forward by Harvey (*Chem. and Drug.*, **1904**, I., 178) for facilitating the drying of the extractive from compound tincture of rhubarb, consisting in moistening the extractive repeatedly with water during the time for drying. Two methods of prosecuting the inquiry suggested themselves to us as worthy of trial:—

(*a*) Conversion of the glycerin into a non-volatile compound of known and constant composition, and weighing it together with the extractive, followed by a determination of the glycerin in another portion of the preparation. A simple calculation would then give the amount of extractive present.

(*b*) Removal of the glycerin and determination of the extractive by weighing the residue.

Our earliest experiments were directed to the devising of a process based on (*a*). The method employed for determining extractive plus glycerin was, in broad outline, as follows:—

The measured quantity of the galenical was concentrated to a low bulk to remove volatile acids; lead oxide was added to the residue, and the mixture dried to constant weight. Following in general this course of procedure, but introducing modifications in detail, numerous experiments were made on preparations containing known quantities of extractive or glycerin, or both, but the results obtained were not sufficiently accurate to justify a recommendation of the process. A fatal objection was the difficulty experienced in some instances in drying the lead oxide mixture to constant weight at the required temperature. The method was therefore abandoned.

Our attention was then turned to the possibility of formulating a process as indicated under (*b*).

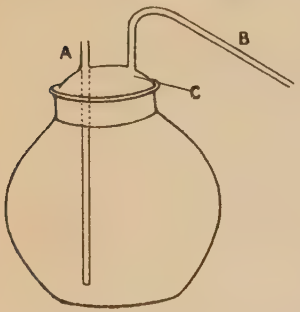
It was hoped that one of the recognized distillation methods for the determination of glycerin in solution might be adapted so as to admit, not only of the determination of this alcohol, but also of the estimation of the solid matter within reasonable limits. After experimenting with the most promising processes, distillation as conducted by Bordas and de Raczkowski (*Comptes rend.*, 1897, **124**, 240–242) was selected for preferential trial. An important modification of the process consisted in providing means against the loss of extractive by splashing whilst ensuring complete volatilization of the glycerin. As early experiments yielded results considerably below the truth for glycerin, a number of determinations on simple glycerin solutions were made with a view to remedying this defect. As incomplete condensation was opined to be the probable cause of the deficiency, water was placed in the two Woulff's bottles, through which the vapour passed. As the results were still too low, a third Woulff's bottle was added. A titration of its contents at the end of the distillation proved that no appreciable amount of glycerin had passed uncondensed through the second bottle. Estimation of the glycerin left behind in the distilling flask showed that the amount, though variable, was not sufficient to account for the difference between the known percentage present in the original solution and that found. As further work indicated that distillation in a combined current of air and steam had no advantage over that of a steam current alone, the use of the air current was in later experiments confined to the preliminary evaporation of the spirituous solvent.

Distillation under reduced pressure—about 30 Cms. below atmospheric pressure—and at temperatures of 120–140°C. was next tried. The glycerin vapour showed a marked tendency to remain in the flask, and attempts to drive it out by the admission of hot water during the operation did not meet with much success.

In the experiments just recorded a wide-mouthed flask fitted with a stout rubber cork was used. To this cork the loss was finally traced, the glycerin condensing on it owing to the low heat conductivity of rubber. The use of a similar flask fitted with a hollow glass-stopper, into which the delivery tubes were fused, immersed up to the neck in a liquid bath at the requisite temperature, resulted in the condensation of less glycerin on the stopper, but did not in all cases completely obviate it.

It was thought that if a tincture containing glycerin were carefully distilled, precautions being taken to prevent splashing, the glycerin condensed on the stopper might be added to the distillate. Further investigation showed that though plashing could not be avoided in all cases, it could with care be reduced to an almost negligible amount.

Subjoined are the details of the method adopted. The flask used for the distillations is a modification of Glassgen's flask for determining water in cement. The stopper is hollow, and has two tubes fused into it. Tube A, which reaches to the bottom of the flask, is cut off not far above the neck. Tube B is bent, as shown in the figure, and cut off level with the inside of the stopper at C. The flask is immersed up to the neck in a bath of a suitable liquid—glycerin itself answers well. In the bath is a coil of compo tubing connected by pressure tubing with a screw clip to A. The connexion should be made in such a way as to leave as little of the tubing outside the bath as possible. Tube B is connected by glass tubing, joined by short lengths of pressure tubing to two Woulff's bottles containing water to a depth of about $\frac{1}{2}$–1 in. above the ends of the delivery tubes. These in turn are connected with a water pump and a manometer.



To conduct an estimation introduce 5 c.c. or other suitable quantity of the galenical into the flask, previously weighed. Place the latter in the bath and connect it to the Woulff's bottle and the coil, the screw clip being closed. Exhaust the apparatus till the pressure is about 18–20 Cms., and then by carefully opening the clip allow a slow current of washed air to pass through the flask. Meanwhile raise the temperature of the bath to 130–140°C. When all the spirit and water have distilled over—known by tube B becoming cool—connect the compo coil with a steam generator, and admit steam very gently at first, to avoid splashing, and then gradually increase the current to a fairly rapid one, which should be continued for three hours, the pressure being maintained at 18–20 Cms. At the end of this period carefully admit washed air till the pressure reaches the normal again. Disconnect the apparatus and wash the stopper and tube B with distilled water, adding the washings to the distillate. Any extractive remaining on the lower end of A should be washed into the flask by a suitable solvent, and the flask and its contents dried in an air oven at 110°C. and weighed. Concentrate the distillate and washing to about 5–10 c.c., filter the residue and wash the basin and filter paper, and make the filtrate up to a definite volume. In this filtrate, or in an aliquot part of it, determine the glycerin by Hehner's bichromate method as modified by Richardson and Jaffé (*Journn. Soc. Chem. Ind.*, **1898,** 330), omitting the treatment with lead subacetate, etc. When working with preparations suspected to contain an amount of glycerin as high as that present in compound tincture of chloroform and morphine, it is more convenient to use 2 c.c. only for the estimation.

The results in the appended table are expressed in grammes per 100 c.c.

TABLE I.

	Present.		Found.	
	Extractive, dried at 110°C.	Glycerin.	Extractive.	Glycerin.
Compound Tincture of Gentian	4·64	9·68	4·82	9·25
Compound Tincture of Cardamoms	6·16	8·44	6·46	8·24
Tincture of Senega	7·99	8·70	8·05	8·02
Tincture of Orange	2·04	17·97	1·73	17·17
Tincture of Orange	2·04	17·97	1·82	—
Tincture of Belladonna	0·55	19·08	0·51	18·40
Tincture of Belladonna	0·55	19·08	0·47	18·51
Tincture of Hyoscyamus	2·86	7·53	2·72	7·28
Compound Tincture of Camphor	0·31	3·62	0·29	3·72
Tincture of Nux Vomica	2·33	2·22	2·35	1·93
Tincture of Opium	3·45	5·12	3·37	5·01
Compound Tincture of Rhubarb, A	3·61	12·60	2·86	12·09
*Compound Tincture of Rhubarb, B	—	12·60	2·76	12·42
Compound Tincture of Rhubarb, B	—	12·60	2·69	12·94
Compound Tincture of Rhubarb, C	3·70	12·60	3·27	12·17
*Compound Tincture of Chloroform and Morphine, A	—	31·50	—	30·97
Compound Tincture of Chloroform and Morphine, A	—	31·50	1·03	30·97
Compound Tincture of Chloroform and Morphine, B	1·28	31·50	0·93	30·87
Tincture of Calumba	1·11	23·25	0·99	—
Tincture of Calumba	1·11	23·25	0·99	23·30
Tincture of Myrrh	5·46	6·45	—	6·25
Tincture of Myrrh	5·46	6·45	5·31	6·14
Tincture of Digitalis	3·67	7·59	3·46	7·67
Tincture of Cascarilla	2·90	4·21	2·51	4·25
Tincture of Podophyllum	3·51	6·99	3·22	6·59

* Prepared by the official process.

To prepare the tinctures a weighed quantity of glycerin was added to a concentrated tincture containing an ascertained amount of extractive, and the product made up to a definite volume with alcohol of the proper strength. Any deposit produced by the addition of the glycerin was uniformly diffused through the liquid before withdrawing the portion for analysis. The glycerin used had been previously assayed, and allowance was made for the water present.

The following table shows the results of an examination of some commercial tinctures.

TABLE II.

	Found.	
	Extractive.	Glycerin.
Compound Tincture of Chloroform and Morphine, A	1·02	—
Compound Tincture of Chloroform and Morphine, A	1·04	27·65
Compound Tincture of Chloroform and Morphine, B	1·05	27·12
Compound Tincture of Chloroform and Morphine, C	1·04	28·44
Compound Tincture of Chloroform and Morphine, D	0·97	28·54
Compound Tincture of Rhubarb, A	3·28	11·61
Compound Tincture of Rhubarb, B	3·12	12·55
Compound Tincture of Rhubarb, C	3·41	12·71
Compound Tincture of Rhubarb, D	2·51	13·11

Of the foregoing estimations, which show a marked deficiency of extractive, it may be justifiably assumed that the loss is due most largely to substances volatilized under the combined influence of the steam current and the low pressure. Proof of this has been obtained in some instances by the recovery of solids from the distillate. On concentrating the distillate from compound tincture of chloroform and morphine and filtering it, in each case a notable quantity of solid matter, insoluble in water, was left in the basin and on the filter paper. The residue obtained in this manner from sample B of Table I. yielded to hot 90 per cent. alcohol, 0·20 per cent. of extractive, dried at 110°C., and calculated on the original tincture, and that from sample D of Table II. by similar treatment gave 0·22 per cent.

Compound tincture of rhubarb contains a yellow substance, which distils over with the glycerin, and being soluble in water passes into the final filtrate. This is accompanied by a small amount of insoluble matter, which, when collected and treated with hot 60 per cent. alcohol, yielded to it in the case of sample C of Table I. 0·05 per cent. of solids, dried at 110°C., and calculated on the original tincture.

The PRESIDENT said the method outlined by Mr. Naylor seemed very simple, and he congratulated Mr. Naylor and Mr. Chappell on having solved a problem which had been on the research list for some years. He remembered conducting some experiments with the same object in view some time ago, but had to abandon as unsatisfactory the processes he tried.

THE CONSTITUENTS OF THE RHIZOME OF *CIMICIFUGA RACEMOSA.*

PRELIMINARY ABSTRACT.

By HORACE FINNEMORE.

An alcoholic extract of this rhizome was treated with the following solvents: Water, light petroleum, ether, chloroform, ethyl acetate and alcohol. The aqueous solution contained a small quantity of isoferulic (hesperetic) acid, 3-hydroxy-4-methoxycinnamic acid (melting point 228°), which was identified by its conversion into its acetyl derivative, by reduction with sodium amalgam to hydroisoferulic acid, by titration and by the estimation of its methoxyl content. In addition a small amount of sugar, tannin, and a crystalline substance (melting point 153°) were present. The petroleum ether solution yielded a phytosterol, palmitic acid, liquid fatty acids containing oleic and other unsaturated acids. From the ether solution was obtained a colourless crystalline substance (melting point 200°C.) and two further crystalline substances (melting points about 260°C. and 225°C.) were isolated from the chloroform solution. The drug contains a trace of an alkaloidal body.

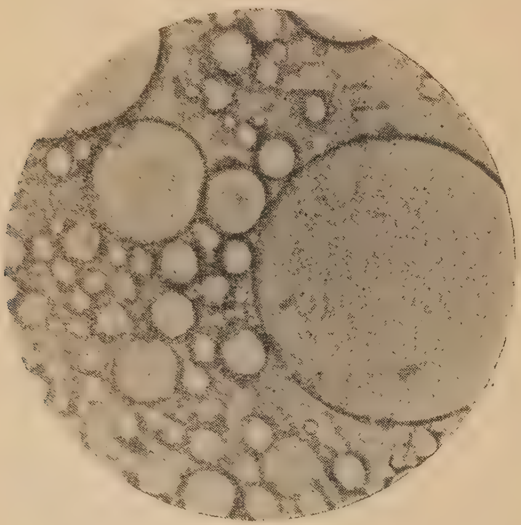
The PRESIDENT said that up till now the chemistry of *Cimicifuga Racemosa* appeared to have been comprised in the terms "cimicifugin" and "racemosin," but nobody yet had been able to say what was meant by these names. Mr. Finnemore had adopted the plan which was considered the scientific one of declining to name the substances he had isolated until he had learned from experiment something definite as to their chemical constitution. In the name of the Conference he thanked Mr. Finnemore for his valuable contribution.

COMMERCIAL EMULSIONS.*

By E. W. Pollard, B.Sc.,

Pharmaceutical Chemist.

In the Conference Research List appears the statement that a report on commercial emulsions would be useful. Below is appended the result of examination of a number of samples drawn from many sources. Some were dispensed at various pharmacies in London and the country, while others were purchased at random; but the majority are samples direct from wholesale houses. The oil content by weight and size of the globules are given, together with remarks upon the character of the emulsion. I intended giving the iodine figure of the oil extracted, but for reasons which will appear later this was abandoned. The usual methods of milk analysis may be used for the determination of the oil, though the separation methods, such as the Werner-Schmidt and Röse-Gottlieb, do not give well-defined layers, for the emulsifying agent in the emulsion tends also to



A.

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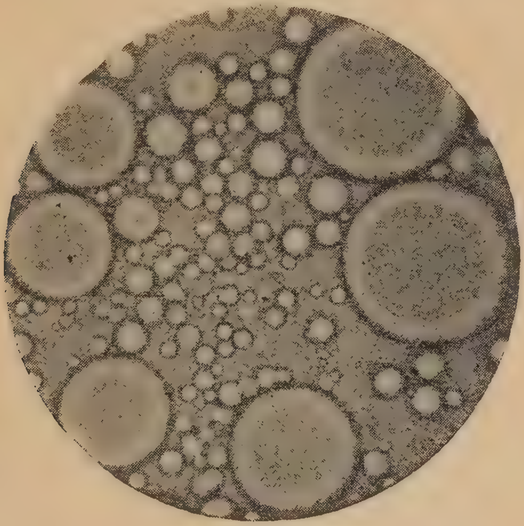
* We are indebted to the Editor of the *Pharmaceutical Journal and Pharmacist* for the loan of the blocks illustrating this paper.

emulsify the solvents used; in this respect petroleum spirit is worst and ether the best.

But of more importance than the ill-defined separations is the fact that in all wet methods several hours are necessary to dry the oil, and during this time, unless an inert gas be used, cod-liver oil undergoes an amount of oxidation which will seriously interfere with the accuracy of the result. The extracted oil, dried in air, is for this reason useless for the iodine figure, for oxidation, even when almost negligible in weight, will seriously lower the iodine absorption.

Extraction in a Soxhlet with carbon tetrachloride is entirely satisfactory, either by the Adams' filter paper or other method.

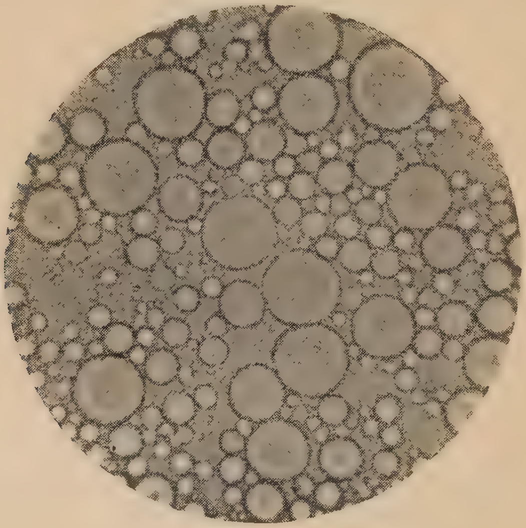


B.

With the former about 2 Gm. of the emulsion is weighed by difference from a small beaker, and worked into the paper strip with a spatula, after the manner of stropping a razor. But here the gummy matter present in the emulsion may form a hard protective sheath to the oil, and several hours' extraction is necessary.

After many trials the following process was arrived at as being best for the substances under discussion.

A small mound (about 5 Gm.) of dried sodium sulphate is made on a watch-glass, and a "crater" capable of holding 2 Gm. formed at the top. The weight is taken, the crater filled with emulsion, the weight again taken, and the contents of the watch-glass tipped into a mortar ; the glass will be left perfectly clean. After absorption of the emulsion the sulphate is triturated and the small nodules formed broken up by the addition of 10 Gm. of coarse sand. The powder thus formed is transferred to the extractor and the mortar rinsed twice with carbon tetrachloride. Extraction is allowed to go on vigorously for two hours ; in this way an anhyhrous solution is obtained which, after the distillation of the solvent, requires only an hour to dry in the water-oven ; nor should longer be allowed. During the drying the flasks are preferably laid on their sides to allow the escape of the heavy carbon tetrachloride vapour.



C.

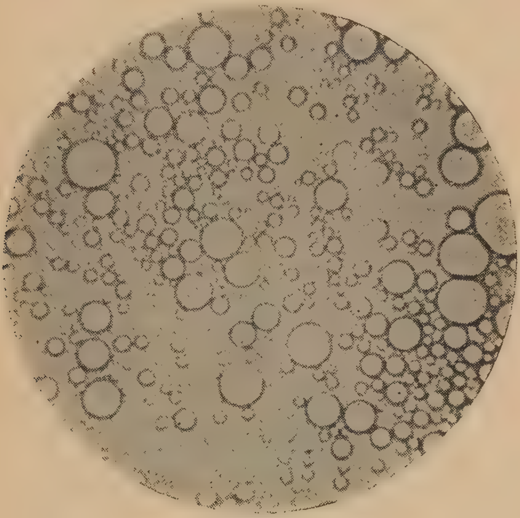
The iodine figure may be obtained by a second extraction, using the carbon tetrachloride solution without distillation.

This process is also suitable for malt and oil, providing only a small quantity be taken ; otherwise a sort of pill-mass will be formed which will not dry. As a check on the process an emulsion was carefully prepared by weight to contain 33·3 per cent. of oil. This in several estimations gave between 33·0 and 33·5, with a mean of 33·23. The process is thus sufficiently accurate for emulsions which vary within wide limits.

With petroleum emulsions the results are a trifle low (about 1 per cent.), owing to loss in drying. The percentage by volume is not easily arrived at, since many of the emulsions were semi-solid, which made the determination of the gravity well-nigh impossible.

Broadly speaking, the wholesale samples were near unity, while the dispensed ones rose to 1·05, owing to the liberal use of gum acacia.

Thus the emulsions vary roughly from 25 per cent. to 50 per cent., and were generally as described on the label; the manufacturers of those containing the lower amounts naturally deemed any information unnecessary.



D.

The prescriptions were all more or less inaccurate, but in this respect the following considerations must be borne in mind:—

(1) The difficulty of measuring accurately in a wide measure as would be used.

(2) The time allowed to drain the measure.

(3) The temperature at which the oil is measured

(4) The loss on the sides of the mortar.

(5) The size of the dispensing bottle.

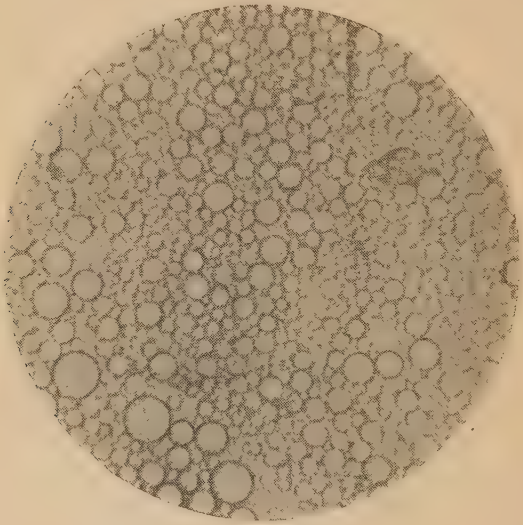
(6) The amount of air bubbles enclosed.

In a complex mixture like an emulsion, 10 per cent. on the result would not be too liberal an allowance in judging accuracy.

The size of the globules is of more interest than the oil content. But here let me say that I am not prepared to lay too much stress on this from a physiological point of view, for emulsions are stated not to be absorbed as such, but as soap.

But from the point of view of "elegant pharmacy" it is of extreme importance.

The photo-micrographs, taken under precisely the same conditions (except J), do not necessarily represent the maximum diameters, but will give some idea of the variation in size. Magnified 300.



E.

A, representing 5, was from a wholesale house having retail establishments, at one of which E (No. 25), was dispensed to my prescription. This latter was 20 per cent. deficient in oil.

B is No. 15, C No. 17.

D (No. 22) is an average machine-made emulsion.

F (No. 29) was dispensed by a lady who had only been studying with me six weeks.

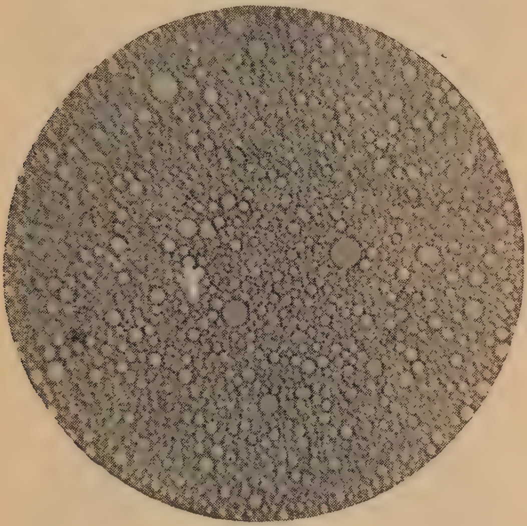
G (No. 32) is a hand-made vaseline emulsion, much diluted. I had great difficulty in getting this photo, for the fluid was in a state of "stream," or showed Brownian movement.

H is cream.

I is Linimentum Ammoniae, B.P.

J is No. 9, magnified 100. This contains 10 per cent. of persistent froth, a considerable saving when bottling large quantities.

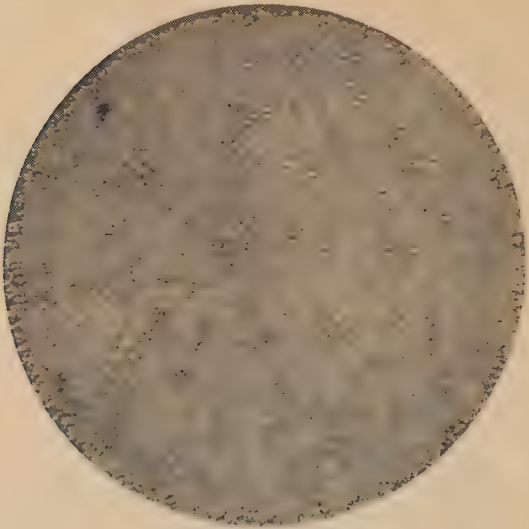
It was not my original intention to discuss emulsions in general or the making of them, but one cannot help seeking some cause for the great variation encountered. It is almost a disgrace that a large globule of No. 5 would accommodate 25,000 of No. 19.



F.

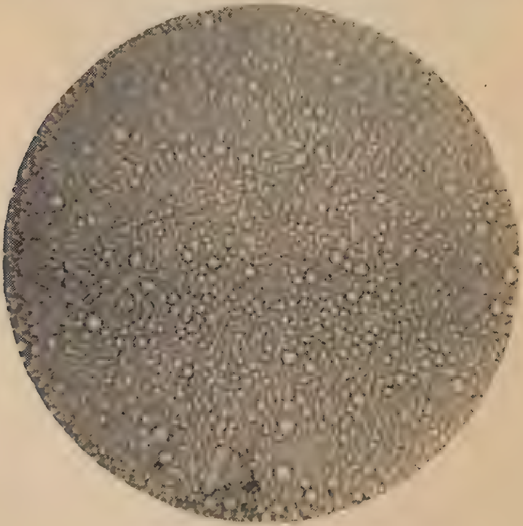
Three papers by Ramsden, Pickering, and Marshall—the last in our own *Journal*—deal with the theory of emulsification, and much of my work is necessarily a repetition of theirs. A few additional ideas from a practical pharmacist may be acceptable to this Conference.

First, as regards the emulsifier used; acacia is *facile princeps* in this respect; saponin is also used, but is very frothy. Soap, though a very fair emulsifier, seems non-existent in commercial emulsions, since none of them "broke" on the addition of acid. Many substances, such as starch, dextrin, tragacanth, egg,



G.

casein, moss, gelatin, are used in many cases rather to bolster up a bad emulsion than to prepare a good one. Almost all commercial emulsions are unnecessarily thick, while some can



H.

I.

be inverted without anything happening; how patients take these is better imagined than described.

J.

With regard to the *modus operandi*, I can only speak with any authority on retail methods. Three may be distinguished :—

(1) The " dry " method is to mix powdered acacia with the whole of the oil, adding water *secundem artem*. This is illustrated by Emulsio Olei Morrhuae, B.P.C.

(2) The " alternate " method, as in Emulsio Olei Morrhuae Composita, B.P.C.

(3) Churning.

The first is the usual dispensing method, and is by far the best. The second is only successful when the proportion of oil is kept sufficiently high to form a jelly. Emuls. Ol. Morrhuae Co., as usually prepared, looks satisfactory, and, being viscous, does not separate.

Microscopically it is a failure, as evidenced by sample 26.

The third was used entirely in Pickering's experiments, and is adapted to quantities. But though this method produces fairly small globules when the menstruum is quite thin, with thick emulsions the manipulation is not easy, nor, judging by the majority of the samples, satisfactory. One must comminute the oil globules by the friction of two comparatively large surfaces. If a pint of emulsion is required it is advisable to take a mortar that will hold a gallon. In this way the " crackle " so familiar to pharmacists is obtained, and when this is quite loud one may be sure the globules are nearing 10μ in diameter.

Emulsification by simple shaking is effectual in Lin. Ammon., and also in the cheaper " white oils " made with turpentine. The former is an excellent emulsion, the formula of which has been evolved probably more by experience than by scientific investigation. I have not obtained such a good emulsion with single oils, other alkalies, or different quantities of oils and ammonia. The latter is also remarkably fine, and illustrates the great " bolstering power " combined with fluidity of white of egg.

The separation of an emulsion is a complex phenomenon, which leads one deep into the domain of physics, and I am diffident in attacking it.

The rate of separation depends on—

(1) The difference between the gravities of the oil and menstruum.

(2) The viscosity of the menstruum.

(3) The viscosity due to the increased percentage of oil.

(4) The viscosity due to the oil-to-water surface ratio.

Number of Sample.		Emulsion taken.	Oil found.	Percentage.	Maximum Diameter of Globules in Micra.	Remarks on Emulsion.	Basis.
Makers known.	1.	1·096	0·454	41·4	50	Semi-fluid "tacky"	Cod-liver oil
	2.	1·634	0·582	35·5	35	Semi-fluid	Cod-liver oil
	3.	1·144	0·479	41·9	20	Nearly solid	Cod-liver oil
	4.	1·300	0·366	28·1	60	Fluid, thin	Cod-liver oil
	5.	1·230	0·498	40·4	120	Fluid, thin	Cod-liver oil
	6.	1·727	0·780	45·1	40	Fluid, thick	Cod-liver oil
	7.	1·009	0·470	46·6	30	Fluid, thick	Cod-liver oil
	8.	2·286	0·782	34·2	20	Fluid, thick	Cod-liver oil
	9.	1·000	0·316	31·6	40	Fluid, thin	Cod-liver oil
	10.	1·270	0·459	36·1	30	Fluid, thick	Cod-liver oil
	11.	1·208	0·357	29·5	15	Fluid, thick	Cod-liver oil
	12.	1·320	0·481	36·4	50	Semi-fluid "tacky"	Cod-liver oil
	13.	1·150	0·324	28·2	15	Fluid, thin	Cod-liver oil
	14.	1·003	0·409	40·7	30	Fluid, thin	Liquid petroleum
	15.	1·081	0·341	31·5	100	Fluid, thick	Liquid petroleum
	16.	1·655	0·510	30·8	100	Fluid, thick	Liquid petroleum
	17.	1·310	0·576	43·9	60	Fluid, thick	Liquid petroleum
	18.	1·228	0·429	34·9	30	Fluid, thick	Liquid petroleum
	19.	1·204	0·410	34·0	4	Fluid, thin	Petroleum jelly
Makers unknown.	20.	1·070	0·322	30·1	30	Fluid, thick	Cod-liver oil
	21.	1·236	0·343	27·7	35	Fluid, thick	Cod-liver oil
	22.	1·074	0·446	41·5	40	Semi-fluid	Cod-liver oil
	23.	1·550	0·345	22·2	20	Semi-fluid	Cod-liver oil
Dispensed.	24.	1·146	0·480	41·9	25	Fluid, thin	Cod-liver oil
	25.	1·014	0·350	34·4	20	Fluid, thin	Cod-liver oil
	26.	1·046	0·493	47·2	100	Fluid, thick	Cod-liver oil
	27.	1·220	0·496	40·6	75	Fluid, thin	Cod-liver oil
	28.	1·232	0·487	39·5	15	Fluid, thin	Cod-liver oil
	29.	1·058	0·456	43·1	10	Fluid, thin	Cod-liver oil
	30.	1·260	0·554	44·0	7	Fluid, thin	Cod-liver oil
	31.	1·020	0·332	32·5	15	Fluid, thin	Liquid petroleum
	32.	1·265	0·536	42·4	3	Fluid, thin	Vaseline

(5) The size of the globules.

While the *amount* of separation depends on—

(6) The comparative uniformity of the globules.

(7) The surface tension of the oil.

Taking these points *seriatim* :—

(1) The greater the difference of gravity the faster the separation. Much soap in solution, as in Lin. Tereb., B.P., accelerates separation.

I was interested to try and find out how far the viscosity produced by acacia counterbalanced the effect of increased gravity. Two ounces of an emulsion prepared according to the old formula —oil, water, gum, four, two, one—and made up to 50 per cent. of oil, was diluted with water to a pint. This was allowed to stand for about a fortnight in a separator, when the " cream " occupied two fluid ounces. This was collected, well shaken, and allowed to stand side by side with two ounces of the original emulsion containing gum. Separation was only slightly more rapid than in the original. I then repeated the operation, making a gallon of dilute emulsion, the oil globules of which closely resembled milk in size. This was " separated " for me by a friendly farmer, but his steam separator, running at 20,000 a minute, played havoc with my emulsion, for the " cream " adhered to the inside of the machine in a solid mass, while perfectly clear liquid came out. A quarter of the speed would have sufficed, but I did not care to trouble him again.

I understand that the price of acacia is deterrent to its use on a large scale ; it certainly makes the best emulsion. There is no reason why it should not be " washed out " in the above way, evaporated to mucilage and used again, being replaced by some glutinous matter if necessary. Professor Marshall has drawn curves showing the emulsifying power of acacia (*Pharmaceutical Journal*, February 27, 1909) ; these indicate that 5 per cent. is sufficient. I have prepared excellent emulsions with this quantity, but the operation is too delicate for anything but experimental quantities. Manufacturers frequently use moss decoction, which is cheap, and, being gelatinous rather than mucilaginous, has great " bolstering " power, combined with low gravity.

(2) The viscosity of the menstruum is almost too well known, but in moderation is probably the only practical way of keeping an emulsion uniform throughout for any length of time.

(3) The viscosity due to increased percentage of oil is illustrated

in Lin. Ammon., but does not concern us much here, as we are dealing with emulsions of under 50 per cent.

(4) The viscosity due to the oil-to-water surface ratio. Reducing a large globule to smaller ones increases this ratio, and consequently the permanence of an emulsion. The increase in viscosity in a strong emulsion is evidenced by the "crackle," which becomes louder as the size of the globule decreases. But in the diluted product the viscosity is not so much in evidence, since a comparatively poor emulsion appears of the same fluidity as an excellent one when prepared with the same ingredients. It is only when an emulsion actually "breaks" that it becomes thin.

(5) The size of the globules. A large globule tends to rise more quickly in a given medium than a small one; (4) and (5) are correlated, but not identical.

(6) The comparative uniformity of the globules. Uniform spheres of whatever size, when packed in a given space, as close as mathematically possible, occupy 74 per cent. of that space. But this arrangement never occurs in practice. If one takes pills, shot, etc., one finds that the space occupied is under 60 per cent. of the whole, and I see no reason why globules in rising should not behave as solids in sinking. But the globules in a present-day emulsion are never uniform, though trituration tends to produce more regular globules than churning. It would evidently be an advantage to have a machine that would produce uniform globules. A fractional centrifuge or strainer might do it.

Cream which consists of fairly uniform spheres will, after standing, say, six months, still contain only about 50 per cent. of fat.

A good acacia emulsion will, after the same time, separate to contain about 55 per cent., leaving a small stratum of aqueous matter at the bottom.

Possibly these separations are entirely explained by consideration of (4).

(7) The surface tension of the oil. This is fairly constant in fixed oils, and only becomes manifest where the tension is abnormally low, as in turpentine. Lin. Tereb. separates after some time, so much that the "cream," which is quite fluid, contains up to 95 per cent. of the oil—a quite unusual percentage in emulsions. Undoubtedly the great difference in the gravities of oil and menstruum in part explains this. But, seeing that the

globules are small—about 8μ—and as regular as Linimentum Ammoniæ, I can scarcely believe that 5 per cent. is sufficient inter-globular space. In all other 95 per cent. emulsions the microscopic appearance is utterly different, consisting of structureless or polygonal masses.

Whether the "cream" of Linimentum Terebinthinæ is composed of spheres or whether the spheres become compressed to regular polyhedra is almost impossible to make out by the microscope, for a number of contiguous spheres out of focus appear as polyhedra, and polyhedra appear as spheres. The low-surface tension of turpentine might indicate that the globules are compressed.

Much suspended matter in an emulsion is objectionable, but with some of the samples, when diluted with water, a sediment equal in bulk to the cream which rose was noticed.

I would in conclusion say that, in addition to keeping qualities, a good pharmaceutical emulsion is one—

(1) Which is no more viscous than glycerin.
(2) In which the globules do not exceed 15μ.
(3) Which on dilution throws down no sediment.

I beg to thank those wholesale houses who have generously forwarded samples, and trust that my paper may not be a mere criticism, but of some use. Also I would thank the Conference Committee for a grant toward the expenses of the work.

The President invited discussion, but as no one rose he said he was afraid the paper was one which it appeared experienced pharmacists were unwilling to express an opinion upon, until they had had an opportunity of studying Mr. Pollard's interesting communication. Without doubt viscosity, surface tension, and specific gravity were important factors in the formation and study of emulsions. The line Mr. Pollard had taken was undoubtedly the right one. His paper was well worth study by the pharmacist and by all interested in emulsion-making. He cordially thanked Mr. Pollard for his elaborate and valuable contribution, which he said he intended to read very carefully, when published, no doubt with profit to himself.

SHOULD THE DISPENSING OF MEDICAL PRESCRIPTIONS BE EXCLUSIVELY CONFINED TO PHARMACISTS ?

By J. F. Tocher, B.Sc., F.I.C.

It was my original intention to devote a section of my presidential address to the problem of medical dispensing, and, indeed, I had a rough draft of what I wished to say prepared for that purpose. The idea of having a discussion here to-day on the question, "Should the Dispensing of Medical Prescriptions be exclusively confined to Pharmacists ?" was afterwards thought of as a more suitable way of bringing the matter before the proper quarter, and of suggesting some practical method of realizing the transference, if this meeting should answer the question in the affirmative. From my point of view the great grievance which the pharmacists of England and of the West of Scotland have above all others, is that they are members of the only class in the kingdom specially educated and properly trained to prepare and dispense medicines and, as such, many of them get little if any employment after they qualify, in the work they have been specially trained to perform, simply because the work is done by the medical profession. I have no hesitation in at once answering the question therefore in the affirmative, because, while practitioners are specially trained in many highly important sciences, they have no practical training to speak of in pharmacy. All the same, we must recognize that it has been a practice from time immemorial for doctors to supply their own physic. If, however, any practical measure could be devised whereby they could now be relieved of this encumbrance—for encumbrance to their work as medical men it is—they would, I feel sure, hail the measure with joy. The total transference of the dispensing of medical prescriptions from medical men to pharmacists would, in my opinion, be accompanied with advantages to the medical man, the pharmacist, and the public. No disadvantage would follow, excepting the disadvantage of slight delay in remote country districts, sparsely populated, and in these districts I think it might be more advantageous to the patient for the medical man to dispense the remedies required. The advantage to the medical practitioner would be that he would be freed from the worrying details of a mechanical nature, foreign to his training and his work, and he could therefore devote his time to much more profit in the proper exercise of his profession, and, by snatching a little time for rest, cease to be the slave-driven, closely tied up, worried professional man he so frequently is all over England. The dispensing practitioner is both a trader and a professional man. He ceases to be a trader the moment he stops selling medicine. The advantage to the pharmacist would be that he would be exercising more and more the calling he has been specially trained and examined to perform. The origin, properties, preparation, and dispensing of medicines is his special sphere. The advantages to the public are many. Without necessarily implying inaccuracies in dispensing by medical men or doubting their skill in the mixing of medicaments, dispensing by pharmacists would be advantageous to the public because their compounding to the medical man's prescribing is of the nature of a check on each. The pharmacist checks the medical man's prescribing, and the medical man checks the pharmacist's dispensing. With a clear and definite understanding between the medical practitioner and the pharmacist with regard to the repetition of prescriptions, no grievance bearing on the frequent repetition or the hawking of prescriptions need arise. No loss, no disadvantage, but rather a gain in the form of a greater security would therefore result from the transference as suggested. Without labouring the point at all, these are facts. It is no reflection upon the medical practitioner to say that his training in medicine and surgery is the material thing, and his connexion with pharmacy incidental, and not due to training in that subject. Neither is it a reflection upon the pharmacist to say that pharmacy is the material thing with him, and his connexion with accessories and with trading in general a necessity for his livelihood. The separation of medicine and pharmacy is a differentiation further urgently called for in view of the great strides made in medical and chemical science. These discoveries, owing to their complexity and practical application, involve much labour, and indeed much study on the part of the medical practitioner, if he wants to keep abreast of modern medicine. Mere dispensing—unimportant to him—is therefore an irritating distraction from work which is absolutely vital to sound medical practice. Friendly societies are specially interested in this matter. Nine years ago, at this time, when I had the honour of addressing one of the leading societies as chairman, I spoke at length on dispensing, and pointed out the advantages which would accrue to members if they made separate contracts for advice and medicine. Now how is it possible to bring about the desired separation of medicine and pharmacy? Obviously we cannot call upon the General Medical Council to act. That body has judicial functions, and we must always bear in mind, what I was recently reminded of by an eminent medical authority, that dispensing by medical practitioners is legal. The Pharmaceutical Council has even less reason to interfere. It has no connexion with, or control whatever over medical men, and its interference as a statutory body would also be highly resented. Our only hope is to proceed unofficially and individually in each locality, and also collectively and unofficially, through the great voluntary medical and pharmaceutical associations. Co-operation should be the watchword. My proposal is to institute a Joint Standing Committee consisting of members of the British Medical Association and the British Pharmaceutical Conference. Later, if practicable or desirable, interested members of the public, including leaders of friendly societies, might be added. This committee's preliminary duties would be of a three-fold character, and would include the following: (1) Dispensing problems, (2) prescribing problems, (3) drug problems. Firstly, it is desirable the committee should collect information from all parts of Great Britain bearing on the actual practice in vogue with respect to dispensing, and with respect to the facilities existing for a transference of the work to pharmacists in the cases where the work is performed by or on behalf of medical men. Secondly, it is desirable the committee should collect information from all parts respecting the practice of treating ailments and prescribing for them by pharmacists, and by other persons untrained and unqualified for these important duties. I personally can distinguish no difference between the person who maims his fellow man for life, or causes his death through a mistake made by him due to ignorance of medical science in which he dabbles, and the person who causes his fellow man's death through his ignorance of and foolhardiness with regard to poisons. The composition of the proposed committee is of such a character as would enable it to give a practical definition of where first aid and simple regulation of bodily functions—a necessity and a duty for every person living—ends, and where medical practice begins. No absolute dividing line exists, but a working formula is, I believe, possible. I say a working formula, for we must always bear in mind that the public is not a widely distributed population of marbles, uniform in size, composition, and quality, with which we can play at will, but a population of human beings, varying in educational attainments, acuteness of intellect, and strength of character throughout very wide ranges. The committee will tell us whether the public should itself judge of these things (the pharmacist abstaining from opinion and action), or, if not, it is desirable we should get a workable formula from the committee by which it would be etiquette for the pharmacist to abide. Thirdly, the committee could deal with the drug problem generally by collecting data as to the composition, sale, and effect on the public of advertised nostrums. The committee in such work would pave the way for the institution of the suggested board of control, whose function would be to suppress quackery and sophistication and to supply the public with useful information. The committee could also render useful unofficial assistance to pharmacopœial authorities when they come to consider—as they are now doing—the revision of the Pharmacopœia. Reverting to the first and primary object of the committee, that of co-operating with medical practitioners to relieve them of dispensing, it appears to me that much assistance can be obtained from those with club practices. The medical practitioner is paid for advice and medicine. How much must be allocated for advice and how much for medicine? This would be discussed by the committee, and the proportions, if possible, determined from a knowledge of the cases where advice and medicine are paid for separately, and from a knowledge of the economic conditions of each locality. Excepting Glasgow, the branches of the friendly societies having a footing in Scotland all contract separately for advice and medicine. The same is true with regard to parish councils and other public bodies and institutions. No harm, but much good, would result from collecting these data, and this would be the first work undertaken by the committee. The differentiation cannot take place in a day. It may be that owing to the stage of the evolution of our race, the change will be long in coming. It may be that owing to the nature of the evolution of the English race, the differentiation may never take place. I can only hope, for the sake of all concerned, that this last view is erroneous. The differentiation will be slow, will be gradual, and, perhaps, almost an imperceptible one, but I believe it will be complete one day. The formation of the committee herein proposed should be the first step towards the realization of the object we have in view. The annual reports by the committee would give us an idea, as time goes on, as to what progress, if any, has been made. Mere speeches are worthless in a problem of this or any other kind. Action must follow. Some definite step must be taken and some plan must be sought which, when found, should be consistently followed by all concerned. I sincerely hope that Newcastle, the scene of the inauguration of the British Pharmaceutical Conference (that strong bond of union between provincial pharmacists) will also be the scene to-day of a new bond of union, namely, that between those who practise the great profession of medicine and members of our own craft.

DISCUSSION.

Dr. J. D. FARQUHARSON wished first of all to offer on behalf of the members of the medical profession in Newcastle a very hearty welcome to the Conference to the district, and to express the hope that they would spend a very pleasant and profitable time. He quite agreed that the question of the dispensing of medical prescriptions was a matter for a joint conference between delegates of the British Pharmaceutical Conference and the British Medical Association. They were the only two bodies who could do any good in the matter. Both had practical experience and both had professional or commercial stakes in the matter, and it would be taken out of the purely academic sphere of a debate before the General Medical Council. There were one or two minor points that occurred to him. Many a time when he had written a prescription and directed it to be taken to the nearest chemist's, it had occurred to him that the people would much rather have had the prescription made up by himself. That was a slur on the chemist which was founded on ignorance, but the people thought that he had something better in his surgery than the chemist was likely to give them. Personally he did not think anything of the sort. He believed in the profession as it was carried on by the pharmacists of the present day there was no room for any such suggestion. Still there was a prejudice in the public mind that had to be overcome, and that should not be lost sight of. He heartily agreed with nearly all that Mr. Tocher said. None of them desired to see the sort of thing that happened in a town like Glasgow, where they might find a medical practitioner who not only had his own house and surgery, but was the owner of half a dozen so-called chemists' shops which were nothing more than open surgeries, where the owner had the double benefit of a medical consultation and the money for the prescription. Those shops were an absolute disgrace. They would often find a bit of a lad behind the counter whose earnings on pennyworths of peppermint and two pennyworths of castor oil paid the rent; but the mere existence of these boys in shops of that description was an absolute menace to the public safety, and they ought to be abolished forthwith. He was quite certain that they would find the medical profession perfectly ready to meet them in a friendly discussion on the subject. He did not know half a dozen men who would not be glad to get rid of the drudgery of mixing their own prescriptions. They were not paid for it; all they were paid for was their professional attendance. He felt that the profession wanted stimulating on the subject, and he would undertake to institute a discussion in the branch meeting of the local association. He believed if interest were stimulated all over the country it would create an opinion which would lead to a much more rapid *rapprochement* between the delegates of that Conference and those of the British Medical Association.

Mr. W. L. Currie said he thought they would all agree that they were greatly indebted to Dr. Farquharson for the very lucid way he had explained his own views. That it was a matter affecting both pharmacists and the medical profession they all knew. Dr. Farquharson had referred particularly to Glasgow as being perhaps the seat of the very worst type of medical dispensing. Unfortunately that was so, and he did not know that it was being curtailed in any way at all. He could remember when there were only three chemists' shops in Glasgow; all the others were conducted by medical practitioners. At the present time he believed there were something like from 180 to 190 qualified dispensers; but there were over 300 doctors' shops, and in not one of those doctors' shops was there a qualified dispenser. With regard to the point which the President introduced as to whether the dispensing of medical prescriptions should be exclusively confined to pharmacists, he could only say it ought to be. Pharmacists were trained men who had been examined by the Pharmaceutical Society, and he believed the great majority of the medical profession recognized that they were the proper individuals to dispense prescriptions. He would make bold to say that medical men were not competent judges of the quality of drugs, they were not competent dispensers, and the proposed change would relieve them of the drudgery of dispensing. He quite agreed some steps ought to be taken for discussing the subject further.

Dr. CUMMING said the crux of the whole question appeared to him to be : How are the best interests of the patient to be served ? It was not a question of finance and business. When they treated of matters of life such considerations must be sunk, and from necessity, if not from feeling, they must be human, even though at the same time they must live. Let them seek a high platform if not the highest—a sure diagnosis, a well-written prescription, and that accurately compounded—with elegance, if they willed. His first contention here was that he only was able to do this latter who had been trained in the theory and practice of the art of dispensing. Theory was not enough. As well may you attend lectures on physic and not walk the hospitals. (Hear, hear.) There was no medical school in the United Kingdom at present training medical students in that art. He knew there was a smattering given, and by whom ? Fifty-four hours' practical work could not produce a pharmacist, nor had a student time, if he had desire and opportunity, to acquire knowledge and the art of dispensing. He need not say that pharmacy was not tumbling a number of substances into a bottle, thereafter labelling and corking the same. By doing that, the very object of the physician may and ofttimes was defeated. The pharmacist must have an intimate knowledge of drugs, able to " spot " them from naked eye appearances, detect inferior qualities and impurities, and chemically test for such if required—qualitative not to speak of quantitative analysis. He must know the active principles of his drugs, their percentage therein, and how combined, likewise the method of extraction. In a word, he was or ought to be a specialist and an expert. And he held that the pharmacist of to-day was such. He would ask them to remember that to-day he was far and beyond anything seen thirty years ago. Take their own city, the city of Edinburgh. There he held a position distinct and honourable. Why ? Because he was what he had said the pharmacist should be, a man in whom confidence could be placed. There doubtless were exceptions, even with them, but that only proved the rule. He regretted that the exception does more than that. He was a distinct hindrance to that general condition which they hoped soon to see there beyond the border. Until the pharmacist, every one of them, could be implicitly trusted that in dispensing of prescriptions he only used the substance prescribed, and that, too, of the best, until then would the millennium be postponed. Moreover, he must show himself a specialist and superior in his department to the medical man, not only on passing the Minor, but ever thereafter—he must be able to advise the physician, to suggest, if they would, the best forms and combinations—always, of course, in keeping with therapeutic value. In short, the pharmacist must be more than a shopman—a mere handler of drugs. He must know his own science not for examination purposes alone, but in order that he may be a pharmacist worthy of trust, and in whom a patient might have confidence. And he made bold to add that he might succeed in business. The weal of the patient was safeguarded in that the pharmacist was a check on the doctor so far as doses, etc., were concerned. and he need not emphasize that as an important point. There was a double check in poisonous drugs in every well-appointed pharmacy where potent drugs were dispensed and the dispenser was checked by another. In that there was a sense of security. Were they all perfect that, of course, would be superfluous, but when they reached this perfection drugs also would be superfluous. Having considered the interests of the patient and safeguarded them, he had no hesitation in passing next to the question of the practitioner as being the next person whose interests ought to be considered. He it was who was in charge of the patient, and directed all concerning him, including drugs. How then were his interests best served ? Was he in any way the loser if the pharmacist had to do with the case ? He might be if the latter stepped from his place and offered advice and opinion as to the action and purpose of the drug. That rarely happened, and was very damaging in the long run to the chemist, but it was a rare occurrence and not by any means a general complaint. They must take the bulk and not an isolated case : "The greater good for the greater number." He might also be the loser should the pharmacist substitute, and that was undoubtedly true, but he made bold to say that in such a city as Edinburgh he could trust 99 per cent. of all pharmacists to do what was right and honest. There might be some other small disadvantages, but the advantages far outweighed these. What, then, was the case for the other side ? The physician was saved the drudgery of preparing medicines at the end of the day—not a light matter in these days of run and hurry. He had his patient supplied with that which he prescribed much earlier than could be the case did he dispense himself. He had a fuller range of drugs from which to choose, he had the advantage of the professional advice of an expert in pharmacy, and, above all, he thought he was saved from himself, and here he was careful to note he was not speaking generally. He was aware that the bulk of the profession were above requiring this safety. They would not descend to things mean and base, but any company of men was judged often by the worst in that company, and they could not shut their eyes to fact. There was a certain class of practice carried on which could not exist without dispensing, and which every honest practitioner deprecated. That blot on the profession would be swept away with the introduction of the pharmacist. But even apart from that class, did not dispensing practice tend to foster commercialism even in the legitimate practitioner? He thought it did, and, if so, it was disastrous and a serious bar to the best interests of the profession. One might say in theory that the doctor prescribing and the chemist dispensing looked well; but how did it work out? Was it a practical success? In Edinburgh, where he knew of but one man who kept a pharmacy, the greatest harmony and goodwill existed, and personally he found the pharmacist most happy and obliging with suggestions and otherwise, and never interfering unless when he had a right—and indeed only when it was his duty to do so. (Applause.) It might be said that in England the conditions differed; that it was an old practice, that the patient looked for his bottle on the spot, and would be much displeased if he did not get it. Every one admitted it would be a great change and could only come in a gradual fashion, but it was time the profession assumed charge of this case, and steered their ship for recovery by whatever method best suited the case, bottle or no bottle, which he took to mean patient master, physician tacking for the favourable wind. Any method which pandered to the public in the face of right was wrong, and the sooner it was righted the better for all concerned. The change would ultimately come, and would work as in other places, harmoniously and well, and above all for the good of the patient, an advantage to the physician and an undoubted profit to the chemist. Everything, too, was ready for this change. Few towns were without a chemist, and he must have his Minor certificate ere he dares to open his shop. Could the pharmacist himself do anything in this matter? Could he hasten matters towards a completion? He could, he was sure, do much and much more than could the doctor. Might he presume to leave the question to them, as the representatives of pharmacy in Great Britain? What could they do? Let the pharmacist look well to himself. Let him see to it that his student days were not finished at the Minor, that it rather was but an entrance to an extended post-graduate course. This adopted first as a duty would become to him a pleasure and a profit. And what of the result? Go where they would he would become a power, he would be able to command practice and confidence, he would take a position in the community which could never be obtained if, on the contrary, he allowed his acquired learning to drop. (Applause.)

Dr. John Wishart said his interest in things pharmaceutical really began when he was awarded the Herbarium Medal of the Pharmaceutical Society of Great Britain, in 1894. He thought the medical profession would gladly leave dispensing in the hands of pharmacists for the following reasons:—

1. Because it occupies precious time—time which would be better spent in leisure or in reading.
2. Because it is a needless expense. The 2*s.* 6*d.* fee per visit should not include medicines.
3. Because it is more or less dirty work for a man who is supposed to always have clean hands.
4. Because after a heavy day's visiting one is not fit mentally to take the responsibility of dispensing.
5. Because in some instances there would be less cost in giving attention to fewer callers.
6. Because there would, in many instances, be more accurate dispensing.
7. Because, at heart, doctors know that dispensing is or ought to be the main province of pharmacists, and, since they have a bit of the golden rule still left in them, I am sure doctors will gladly give you back your own *for theirs.*

On the other hand, they desired to retain the dispensing of medicines—

1. Because the public are not sufficiently educated to know that doctors ought only to prescribe, and pharmacists only to dispense.
2. Because faith makes the patient believe that his or her doctor can dispense the medicine required far more accurately than the pharmacist.
3. Because every time that a prescription requires renewal the doctor gets no fee unless the pharmacist refuses to dispense it oftener than once, whereas when the doctor dispenses his own goods he gets a fee every time.
4. Because patients who get prescriptions hand them round a series of friends (and even a series of enemies if they have derived no benefit

from them). In this way they prevent the medical man from getting his just reward.

5. Because in colliery districts the contract fee paid to doctors by miners includes medicines as well as medical attendance; and the same is true of many friendly societies, as well as of the Post Office authorities.

6. Because all districts are not, at present, reasonably supplied with pharmacists if dispensing is left entirely in their hands.

7. Because pharmacists prescribe.

8. Because the country is deluged with proprietary and quack medicines, each of which is guaranteed to heal the same pain or purge the same anchor. This leads to a greater struggle for life in the case of both medical and pharmaceutical professions.

9. Because pharmacists have not so efficient a night service as they might have.

10. Because so many hospitals and dispensaries distribute medicines gratuitously to people who are quite able to pay for them.

He would like to suggest, however, to whichever committee was formed that they consider the following problem—

1. Dispensing by doctors and prescribing by pharmacists in this and in other countries.
2. The supply of medicines to patients who contract for medical attendance and medicines together, and more especially where no pharmacist resides within reasonable reach.
3. The return of the prescription to the doctor instead of to the patient—not only for the sake of ensuring the doctor his just fee, but also of preventing the drug habit. This includes the question of who is the real owner of a prescription.
4. The accuracy of dispensing.
5. The supply of medicines during closed hours.
6. The free distribution of medicines by hospitals, dispensaries, etc.
7. The quack drug trade, including the public advertising of the same.
8. The urging of university authorities throughout the kingdom to pass resolutions similar to the Aberdeen University one, which has been in force since 1901, and which is as follows—

"Whilst it is admitted that the exigencies of practice in certain localities may sometimes render it unavoidable for a medical practitioner to supply to his patients the remedies he prescribes, the medical faculty of this University is of opinion that it is undesirable and detrimental to the position of medical graduates of the University that this custom should be followed under other circumstances; and further, it regards the sale of objects other than remedies by its medical graduates as, under all circumstances, to be strongly deprecated."

In this connexion let me remind you that no medical man can become a Fellow of the Royal College of Physicians of either England or Scotland if he dispenses medicines or enters into a contract with a pharmacist for the supply of medicines to his patients.

If they decided to elect a committee to consider the question before them, he trusted his few straightforward remarks would do more to help than to hinder them.

Mr. Peter Boa said in his opinion dispensing ought to be confined to pharmacists, and he thought there ought to be in the Pharmacy Act a clause giving them the sole right to dispense the same as their friends in that distressful and delightful country on the other side of the water. The tendency of modern education was towards specialism, and the separation of dispensing from medical practice would come in the ordinary course of events. He really had no hope from legislative interference unless it came from the medical side of the profession. He thought it was only fair on the part of the medical profession to admit that the dispensing of medicine was not a thing which they wanted or desired, but had been thrown upon them in self-defence. He believed the origin of dispensing by medical men arose in this way, that at one period in the history of medicine there were apothecaries whose business it was to dispense medicine. In the course of time they became legalized to medical practitioners, and while it was still their province to dispense medicine, they took what might be called a somewhat pronounced admiration for themselves and began to attend people in the medical way, but it seemed that they could only recover their fees in cases where they supplied medicine, and the consequence was they invariably supplied medicine as well as medical advice. So the medical practitioner had to supply medicine practically in self-defence. He believed that was how the dispensing of medicine came to be thrust upon the profession. In Ireland the apothecaries were practically in the same position, but they behaved in a different way; they confined themselves to the dispensing of medicine. When the Pharmacy Act of Ireland was passed about thirty years ago the mantle of the apothecary fell upon the pharmaceutical chemist, who now had the sole right of compounding medicines. The question of separation, he believed, would right itself in the course of time, and there were already indications that that time was coming. He believed that the authorities connected with the Poor Law of England had actually forbidden the dispensing of medicines by medical men. In smaller districts, from questions of economy, of course it had to be done, but it was an indication of the tendency of public opinion on the matter. In the best class of pharmacy in Great Britain and Ireland what was called counter-prescribing was entirely tabooed and reduced to a minimum, and the feeling on the part of the best people on both sides was distinctly against a combination which was not to the advantage of either. He believed it to be known that there was less progress from a medical point of view in those districts where medical dispensing was mostly carried on, and the same thing held good with regard to pharmacy, so that the continuation of dispensing by medical men retarded the progress of both. The point they had to bear in mind was that it was a question which would probably be settled gradually. There was one aspect of it which might probably lead to a more rapid result, and that was if the public took the matter up on its own account. The preamble to the Pharmacy Act said, " Whereas it is expedient for the safety of the public " that men should be qualified in order to handle drugs ; that, he thought, was probably the keynote of the whole situation. He had nothing further to say, but he hoped it would be found " expedient for the safety of the public " that there should be a separation of the two branches of medicine in due course, and without any friction between the two.

Mr. W. F. WELLS then proposed the following resolution—

> That this matter be referred to the Executive Committee of the British Pharmaceutical Conference to consider, and if thought advisable to confer with the British Medical Association in reference to it,

and said the question was one that ought to be approached with an idea of a little give and take on both sides. It was a subject that would be very difficult to deal with because they each maintained their own side of the question. He believed if the matter were fairly discussed there could be no question as to what was right in the interests of the public. That was the point of view from which they had to look at it. It was not what was good for the doctor or the chemist, but what was for the benefit of the British public. He believed if it were approached from that point of view the result would be of great benefit to all.

Mr. W. GILES seconded the resolution, and said the importance of the question demanded very careful consideration before any definite action was taken. They had listened to a very interesting discussion, and it had been clearly established that it was the ultimate benefit of the public that had to be considered. If some definite action resulted from the discussion, he thought it would lead to the advantage of the medical profession and at the same time promote the interests of the pharmacists. He also believed the public would be the chief gainer in the end.

Mr. PENTNEY suggested that the executive should have power to add to the number of the Committee. He congratulated the President on having brought the subject before the Conference.

To his mind, it was one of the most important questions that had ever been placed before the Conference, because it referred to the bread and cheese of them all. He was sorry there was not more time to discuss the question, because he had no doubt there were many others who would like to take part in the discussion.

PROBLEMS OF THE POISONS SCHEDULE.

By H. Wippell Gadd, F.C.S.,

Of the Middle Temple, Barrister-at-Law.

Amidst the many discussions which have taken place concerning the Poisons and Pharmacy Act of 1908, the questions about titles which have arisen, the indignation which has been aroused by the provisions of Clause 2, and, still more, by the lax reading thereof by local licensing authorities, the changes in the Poisons Schedule have not perhaps received the notice their importance merits. Yet they concern the every-day practice of pharmacists, and involve some difficult questions which are eminently suitable for discussion by the members of this Conference, and to some of these I desire to direct your attention.

"Alkaloids, all poisonous vegetable alkaloids and their salts," is now altered to "Alkaloids, all poisonous vegetable alkaloids, not specifically named in this Schedule, and their salts, and all poisonous derivatives of vegetable alkaloids." These last words are most important, introducing, as they do, into the Schedule some potent remedies which were previously outside its scope. On careful consideration, however, they do not prove to be as comprehensive as at first reading they would appear to be; and, moreover, like the historic description of a crab, they are excellently definitive with but three reservations: the difficulty of giving an exact meaning to the word "poisonous," the uncertainty as to what is a "derivative," and the trouble which even arises when it is attempted to state exactly and concisely what is meant by an "alkaloid." "Poisonous," like the corresponding substantive "poisons," is a word that may be made so comprehensive that it ceases to warn, or so exclusive that many substances of moderate toxic power are left outside its range, with consequent danger to life and health. Wynter Blyth, in his classic work, defines a poison as: "A substance of definite chemical composition, whether mineral or organic, which is capable of being taken into any living organism, and causing, by its own inherent chemical nature, impairment or destruction of function." Murray, in the "New English Dictionary," gives : "Any substance which, when introduced into, or absorbed by, a living organism, destroys life or injures health, irrespective of mechanical means or direct thermal changes. Popularly applied to a substance capable of destroying life by rapid action and when taken in a small quantity." For the purpose of practically observing the spirit of this part of the Schedule, remembering that pharmacists traditionally err, if at all, by excessive caution, rather than by laxity, I would submit as a working definition of a poisonous vegetable alkaloid and of a poisonous derivative of a vegetable alkaloid: "Any such alkaloid or derivative, the maximum dose of which for an adult does not exceed two grains." This sounds arbitrary, empirical, and inclusive, but it brings into the Schedule surprisingly few substances, and is, I submit, good for practical purposes. But we have yet to consider what is a derivative of a vegetable alkaloid ?

Murray states that in chemistry "a derivative is a compound obtained from another, e.g., by partial displacement." The Commissioners of Inland Revenue, in their regulations made under the Spirits Acts, speak of "Methylated spirit, or any derivative thereof, with the exception of sulphuric ether, chloral hydrate, or chloroform." But such meanings can surely not be given to the word "derivative" in the connexion in which we are considering it. They would bring into the Schedule substances the inclusion of which was never contemplated by the Legislature. If "derivative of" means "manufactured from," ammonia gas may conceivably be called a derivative of an alkaloid, and ergo a concentrated solution of it may be within the Schedule. But chemists do not understand "derivative" thus. They mean, I submit : Any substance which may be prepared from another ; for example, by substitution or oxidation, without essential alteration in the molecular structure of the parent substance. If this definition is bad, I ask for a better ; if it be good, I do not claim paternity. But what is a vegetable alkaloid ? "A nitrogenous plant product of a basic nature, which is either (*a*) a derivative of pyridine, (*b*) a derivative of quinoline, or (*c*) a substituted amine or amide, which has a more or less simple relation to ammonia." Having thus defined the terms of this entry in the Schedule, I append a list of derivatives of alkaloids used in medicine which fall within its scope :—

Acetomorphine and its Salts (Heroin).
Apomorphine and its Salts.
Benzylmorphine Hydrochloride (Peronine).
Cotarnine and its Salts.
Ethylmorphine Hydrochloride (Dionine).
Eucodeine (Methyl Codeine Bromide).
Eumydrine (Methyl Atropine Nitrate).
Euporphine (Apomorphine Methyl Bromide).
Homatropine and its Salts.
Morphosan (Morphine Methyl Bromide).
Narcyl (Ethyl Narceine Hydrochloride).
Oxysparteine Hydrochloride.
Tropacocaine.

"Atropine, preparations of," becomes "Atropine, and its salts and their preparations," whilst the following new item appears :—"Belladonna, and all preparations or admixtures (except belladonna plasters), containing 0·1 or more per cent. of belladonna alkaloids." Belladonna and its preparations were in Part 2 of the old Schedule ; now, by the introduction of the percentage principle, the following are in Part 1—

Chloroform of Belladonna (B.P.C.).
Green Extract of Belladonna.
Alcoholic Extract of Belladonna.
Liquid Extract of Belladonna.
Glycerin of Belladonna (B.P.C.).
Liniment of Belladonna.
Suppositories of Belladonna.
Ointment of Belladonna.
Ethereal Tincture of Belladonna (unofficial).
Whilst the plaster, the pessaries (B.P.C.) and the tincture fall into Part 2.

"Cantharides" becomes "Cantharides, and its poisonous derivatives." Here by derivative must be meant manufactured or extracted from, the intention presumably being to bring in cantharidin and the cantharidates.

Other alterations in the Schedule I have noted in a handbook on the subject, but the final clause in Part 2 requires very careful consideration. It reads as follows :—"All preparations or admixtures which are not included in Part 1 of this Schedule, and contain a poison within the meaning of the Pharmacy Acts, except preparations or admixtures the exclusion of which from this Schedule is indicated by the words therein relating to carbolic acid, chloroform, and coca, and except such substances as come within the provisions of Section 5 of this Act." In order to make this sentence clear it may be well to deal with the exceptions first. "Except such substances as come within the provisions of Section 5 of this Act." Section 5 of the Act, I may remind you, deals with the selling of sulphuric acid, nitric acid, hydrochloric acid, and soluble salts of oxalic acid, and such other substances as may for the time being be prescribed by Order in Council under this Section; and the only meaning that I can attach to the exception is therefore that soluble salts of oxalic acid might have come within the second part of the Schedule, if they had not already been provided for under Section 5. Again, preparations and admixtures of carbolic acid, chloroform, and coca are specifically dealt with in the Schedule, on the basis of percentage composition, being placed in Part 1, in Part 2, or outside the Schedule altogether, according to their strength. The third exception is "preparations or admixtures included in Part 1." Obviously these cannot be in Part 2. Having thus disposed of the exceptions, we may paraphrase the clause thus: "All preparations or admixtures which contain a poison within the meaning of the Pharmacy Acts are in Part 2." A poison within the meaning of the Pharmacy Acts is a substance included in the Schedule of the 1908 Act, or one which may in the future be added to that Schedule by the method provided in the 1868 Act, and adopted in the 1908 Act. Not being able to look into the future we are at present confined to the substances included in the Schedule of the 1908 Act. Our clause may therefore be reduced to: "All preparations or admixtures which contain a substance in the current Poisons Schedule are, *ipso facto*, *themselves* placed in Part 2 of that Schedule."

This brings us to the question—What is a "preparation containing a poison, etc." ? Note.—It is not "a preparation of," but "a preparation containing." I submit that a preparation containing a scheduled substance is a preparation in which that substance retains its essential characters, having suffered no alteration other than the removal of insoluble and inert matter. Thus, tincture of digitalis, although it only contains such parts of foxglove leaves as are soluble in 60 per cent. alcohol, may, in my opinion, be called a preparation containing digitalis. A de-emetinized preparation of ipecacuanha could not, on the other hand, be accurately described as a preparation containing ipecacuanha. An admixture containing a scheduled poison is a compound in which that poison is mechanically mixed with other substances. Perhaps the matter will be made plainer by leaving abstract definitions for concrete examples. I propose therefore, to take each substance in the Schedule, with the exceptions already noted, and indicate the articles contained in the

Substance.	Preparations brought into Part 2 by the General Clause at the end thereof.	Admixtures brought into Part 2 by the General Clause at the end thereof.
Belladonna	Tincture, Plaster.	
Cantharides		Ointment. Cantharides Plaster. Warming Plaster.
Corrosive Sublimate	Solution.	
Nux Vomica and Strychnine	Easton's Syrup.	
Opium and Morphine	Tincture of Opium. Ammoniated Tincture of Opium. Compound Tincture of Camphor. Liquid Extract of Opium. Liniment of Opium. Solution of Morphine Acetate. Solution of Morphine Hydrochloride. Solution of Morphine Tartrate.	Ointment of Galls with Opium. Compound Lead Suppositories. Compound Kino Powder. Aromatic Powder of Chalk with Opium. Ipecacuanha Pill with Squill. Morphine Lozenges. Morphine and Ipecacuanha Lozenges.
Chloral Hydrate	Syrup of Chloral Hydrate.	
Digitalis	Infusion of Digitalis. Tincture of Digitalis.	
Mercuric Iodide		Ointment of Red Iodide of Mercury.
Red Precipitate and all Oxides of Mercury		Yellow Oxide of Mercury Ointment. Red Oxide of Mercury Ointment.
White Precipitate		White Precipitate Ointment.
Strophanthus	Extract of Strophanthus. Tincture of Strophanthus.	
All poisonous vegetable alkaloids and their salts.	Extract of Colchicum. Extract of Hyoscyamus. Extract of Calabar Bean. Extract of Stramonium. Liquid Extract of Ipecacuanha. Liquid Extract of Jaborandi. Hypodermic Injection of Apomorphine. Ipecacuanha Lozenges. Tincture of Colchicum Seeds. Tincture of Conium. Tincture of Gelsemium. Tincture of Hyoscyamus. Ethereal Tincture of Lobelia. Tincture of Stramonium. Belladonna Juice. Hemlock Juice. Hyoscyamus Juice. Scoparius Juice. Hemlock Ointment, Colocynth and Hyoscyamus Pills. Vinegar of Ipecacuanha. Colchicum Wine. Ipecacuanha Wine.	Homatropine discs (Lamellae). Physostigmine discs (Lamellae). Stravesacre Ointment. Veratrine Ointment.

British Pharmacopœia, which, in my opinion, are preparations or admixtures containing these substances. (See table on page 296.)

One includes some of these substances with regret, to treat ipecacuanha wine as a scheduled poison is a *reductio ad absurdum*, and, moreover, is calculated to weaken the warning value of the word "poison." I submit, however, that it contains poisonous vegetable alkaloids, and until we have a judicial interpretation of the doctrine, *De minimis non curat lex*, the fact that these are present in comparatively small quantities does not affect the question.

The President thanked Mr. Gadd for his interesting paper.

ANTIMONIUM SULPHURATUM.

By F. H. Alcock.

Not much information is available concerning this substance as far as I have been able to find in pharmaceutical literature. Several excellent papers have appeared on the subject, notably those of Mr. John Moss, Mr. Trembath, and most recently Messrs. Lloyd Howard and J. B. F. Harrison. These have dealt mainly with the preparation and general characters from the manufacturing point of view. It is a compound which is not much used in medicine and pharmacy, so much so that Mr. W. Martindale suggested its deletion from the B.P., in spite of the fact that it was one of the chief ingredients in Plummer's Pill, which, by the way, has recently been taken up and prescribed by a Birmingham medical knight.

It has a very large importance, however, in some commercial circles, and, as is generally known, plays an important part in the indiarubber trade, and many tons are used annually. It is a difficult matter to get exactly what the vulcanizer requires, and as an analyst I have been made acquainted with a great variety of samples from an analytical point of view. The maker of red rubber goods wants a particular result, and his products to respond to certain tests of colour, uniformity, resilience, and keeping properties, and it seems a perennial source of trouble to him. The substance contains sulphur in several forms, and he wants to know what these are and their quantities. Sulphur may be present, and often is as sulphuric acid, calcium sulphate, free sulphur, colloidal, and otherwise, and as the normal trivalent sulphide and the pentavalent sulphide, and these in very variable quantities. The analyst has, however, to be on the *qui vive* for anything and everything in this commercial variety, and I have been surprised to find amongst numerous other extraneous compounds calcium phosphate; other writers have noticed the more common admixtures, such as sodium salts and the like.

In trying to solve the problem of variation of results when this substance is an ingredient used, I have come to the conclusion that the lime is not always present as sulphate, neither does it contain much calcium sulphide, but it contains thiosulphate; and this is a detrimental constituent, as I have been able to show over and over again in the case of another compound used in the rubber industry, viz., lead sulphide, which often contains some thiosulphate. The main reason for coming to this conclusion is that the amount of lime found does not agree with the amount of sulphate present, and no other common compound of calcium existed in it, e.g., carbonate, chloride, etc. Again, the amount of free sulphur which can be extracted by carbon disulphide does not agree with the amount of sulphur which is left after solution in hydrochloric acid, which appears to increase in quantity as if derivable from the chemical decomposition between the thiosulphate and sulphide, and does not agree with what would have been obtained if it had been pentasulphide. During the course of my experiments I have come to the conclusion that in the assay of the antimony constituent by the usual methods there is much left to be desired. It should not be forgotten that antimony trichloride is volatile perceptibly, and solution should be effected over a vertical or reflux condenser, and also that all hydrogen sulphide should be eliminated before subsequent dilution takes place, or grave error arises. The use of Rochelle salt here is recommended, as has been suggested previously, and the antimony can be with fairly uniform results determined by means of the volumetric solution of iodine in alkaline solution in the usual way. The determination of the oxide in it by the Rochelle salt process should be given plenty of time, and the filtered solution should also be titrated in a similar way. With ordinary care concordant results are obtained. The method of obtaining total sulphur may be by the alkaline method or the acid method, but it is greatly to be wished that some more agreeable method could be adopted than the use of fuming nitric acid, or even the 1·42 acid with bromine. The Carius method I have not been able to recommend to the student in pharmacy, and the thought of my experience of him with it in past years makes me shudder. I would like to say that I have tried with some measure of success passing chlorine gas through a warm alkaline solution of Antimonium Sulphuratum in potassium hydroxide (free from sulphate) with subsequent removal of the antimony pentoxide, washing with solution of ammonium chloride as previously suggested, but the last traces of free sulphur require some patience to thoroughly oxidize. For the process I used a Will and Varentrupp tube, which effectively resisted all reflux action and consequent loss of material.

May I just for a moment refer to the B.P. method of dealing with the oxidation of antimony ? It is that suggested by Tilden (1870), with an important omission. He stated that the product would impart nothing to water, thus eliminating the impurities which some workers have found, as sodium sulphate, calcium sulphate, etc., without this proviso, the test possesses not so much value.

When Antimonium Sulphuratum is treated with warm solution of potassium or sodium hydroxide, there will frequently be observed a black residue. This, while it might be many other things, I have often found to be iron sulphide, and it might be an advantage to say in the official tests that this should not be present. Traces of silica in the form of sand are sometimes seen at this stage.

THE DETERMINATION OF ANTIMONY IN ITS SULPHIDE PREPARATIONS.

By David Lloyd Howard and J. Bristowe P. Harrison, F.I.C.

In a paper communicated to the Manchester Conference, held in 1907, on "The Properties of Antimonium Sulphuratum," we drew attention to the possibility of a serious error that may arise in the quantitative test for this substance, as laid down in the British Pharmacopœia, owing to the presence of non-oxidizable substances.

No method, so far as we are aware, has yet been published for the rapid and accurate determination of antimony when existing in the form of sulphide, the usual gravimetric process of bringing into solution, reprecipitating as sulphide, drying, and converting into the trisulphide by heating in a current of carbonic acid being scarcely in keeping with the usually rapid methods to be found in a works laboratory. Accordingly, we have devised a method of assay for Antimonium Sulphuratum which is rapid, is applicable to the sulphide preparations in general, and has the further advantage that both the antimony and sulphur can be determined on the same quantity of substance.

Epitome of Process.—The sulphide of antimony is fused with sodium peroxide, whereby the antimony is converted into sodium metantimonate, which, after bringing into solution and reducing to the lower state of oxidation, is determined volumetrically by means of standard iodine solution. The sulphur which is thus oxidized to sulphuric acid is determined by precipitation as barium sulphate.

Antimonium Sulphuratum and Golden Sulphides of Antimony.—About 0·5 gramme of substance is weighed into a nickel crucible of about 60 c.c. capacity and intimately mixed with 4 grammes pure anhydrous sodium carbonate; 4 grammes of sodium peroxide are now added, again mixing thoroughly, and the whole covered with a thin layer of sodium peroxide. The sodium carbonate is added as a diluent, for if the peroxide alone is used in the presence of much free sulphur, deflagration invariably takes place owing to the rapidity of the reaction, with consequent loss of substance. The covered crucible is then cautiously heated by means of a *very small* bunsen flame, which, after the reaction has commenced, is increased sufficiently to bring the whole contents of the crucible into a homogeneous molten condition. The mass is kept in a state of fusion for a few minutes longer and allowed to cool. Any fusion splashings on the lid are now washed into a convenient-sized beaker, with sufficient water just to cover the bottom of the beaker. The crucible, after placing in the beaker, is filled up with hot water, and the whole digested on a water-bath until all the effervescence has ceased, when the melt will be found to have become entirely detached. The crucible is then well washed and removed from the beaker, keeping the volume of wash water as low as possible. To the contents of the beaker are now added 25 c.c. of concentrated hydrochloric acid to roughly neutralize the soda, and afterwards about another 15 c.c. of acid to bring the antimony into solution, and the whole is allowed to digest with occasional shaking until the solution becomes almost clear. It is scarcely necessary to add that the beaker should be covered with a clock glass in all these operations to avoid loss by spurting. The contents of the beaker are then heated over a bunsen flame until the solution is perfectly clear and bright, and until all free chlorine has been expelled After cooling, the solution is made up to a known volume (say 250 c.c.).

Black Sulphide of Antimony.—The procedure is exactly the same, except that only 3 grammes each of sodium carbonate and peroxide are necessary per 0·5 gramme of substance. As no free sulphur is present in this substance, the liability to deflagration is here practically nil.

Antimony Determination.—100 c.c. of the solution (equal to 0·2 gramme of substance) thus obtained are reduced to the antimonious state by the addition of about 1 gramme of powdered potassium metabisulphite, and gently boiling the whole until all trace of sulphur dioxide has been removed. A few drops of phenolphthalein indicator are added, and fairly strong caustic soda solution until a permanent pink coloration is obtained, and finally solution of tartaric acid, until the precipitate formed is redissolved. After cooling thoroughly, about 3 grammes of solid sodium bicarbonate are added, and the antimony estimated by titration with decinormal iodine solution. 1 c.c. decinormal iodine=0·006 gramme antimony.

Sulphur Determination.—50 c.c. of the clear solution are heated to boiling and precipitated with excess of barium chloride solution in the usual manner. The reagents used should, of course, be tested for sulphur, which, if present, should be allowed for.

The following results were obtained, using the methods of procedure described—

	Black Sulphide of Antimony (Commercial).	Antimonium Sulphuratum. Laboratory Preparation.	Antimonium Sulphuratum. Manufactured Product.	Antimonium Sulphuratum. Sample "A."	Antimonium Sulphuratum. Sample "B."
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Antimony .	69·30	33·90	39·54	36·25	20·85
Sulphur . .	27·34 (27·72 theoretical).	64·13	58·22	58·62	39·13
Combined Antimony and Sulphur	—	98·03	97·76	94·87	59·98

Samples "A" and "B" are the same as those mentioned in our former paper. The manufactured sample, however, has not been referred to previously. With reference to the Antimonium

Sulphuratum preparations, it will be seen that the manufactured sample has the highest antimony figure, this being about 5½ per cent. greater than that of the laboratory preparation. This should occasion no surprise, as it is often easier to obtain a more ideal product on a large scale than on a small one. Expressed as antimony tetroxide, the ultimate product obtained by the oxidation of the sulphide with nitric acid and igniting the residue, the antimony contents of this sample would appear as 50·1 per cent. *i.e.*, on 3 grammes of the substance 1·5 gramme residue should be obtained. The limits we formerly suggested for this preparation are considerably in excess of this, which is due to the fact that those limits were founded on residues obtained by heating to "redness" over a bunsen flame, while we have since discovered that the last traces of sulphuric acid can only be effectively got rid of by strong ignition over the blowpipe or in a muffle furnace.

As we have previously shown, sample "B," although yielding a normal amount of residue by the B.P. method of determination, contained a large percentage of sodium sulphate. It will be seen, however, from the above table, that the total antimony and sulphur contents show that this sample has not been prepared in accordance with the official requirements. As a result of the work recorded in this paper in conjunction with our former work, we are of opinion that the antimony figure is the only reliable basis in forming an opinion as to the genuineness of manufactured sulphide preparations, and would suggest, with reference to Antimonium Sulphuratum, that this should never be less than 30 per cent., and also that the combined antimony and sulphur contents should form at least 95 per cent. of the whole product.

DISCUSSION.

Mr. TYRER said he had no hesitation in saying the suggested method in the paper met a very great want. He thought the reader of the paper was to be congratulated on the method, which was comparatively easy and an exceedingly good one.

Mr. BRANSON suggested the use of a high power bunsen as more convenient than a blow-pipe.

Mr. ALCOCK was glad to find the authors agreed with the use of the volumetric method for the assay of the official antimony compounds, and he could say that the special use of the diluent was a distinct advantage, as was also the use of the potassium chlorate which has, since the writing of the paper, been adopted. He would remind young operators that the use of the gas flame is not advisable, but if such must be used then the base of the crucible should be carefully cleansed before transference to the beaker of water, because of the presence of much sulphur in coal gas, which would add to the amount of sulphur actually present in the sample examined. The standard of purity suggested would be agreeable to pharmacists, but the quantity of iron should be as low as possible, and would be easily detected, as stated in his note which had just been briefly abstracted.

Mr. RUTHERFORD HILL said in some recent work on Liquor Antimonii Chloridi he found oxidation of the Antimonium Sulphuratum, and volumetric estimation of antimony by iodine worked very well. This suggestion to use sodium peroxide as the oxidizing agent supplied the one desideratum required to make the process perfect. He employed fuming nitric acid, but the result was not quite satisfactory. Deflagration with potassium chlorate was tried, but did not quite give satisfaction, and the use of a diluent was not thought of. He could testify that the titration method with iodine could be relied upon to give accurate results. This suggestion was another addition to the uses of the alkaline peroxides, which promise to become one of the most serviceable reagents of the analyst.

The PRESIDENT accorded the thanks of the Conference to the authors of these two papers.

CONCERNING THE QUANTITATIVE DETERMINATION OF FREE SALICYLIC ACID IN BISMUTH SALICYLATE.

BY J. BRISTOWE P. HARRISON, F.I.C.

Some time ago my attention was drawn to a paper entitled "Testing for Salicylic Acid in Bismuth Salicylate," by Mr. W. Lyon, which appeared in the issue of *The Pharmaceutical Journal* of January 2, 1909. In this Mr. Lyon took exception to my assertion in a paper on the same subject read at last year's Conference, that the "benzol" method of testing, as prescribed in the *British Pharmaceutical Codex*, was practically worthless. Mr. Lyon, after bemoaning the fact that those responsible for the compilation of the Codex adopted as their test a "somewhat free transcription" of one he had worked out some years before, goes on to regret that I did not discover his test in "the past literature on the subject."

Before commencing an original investigation it is certainly my usual plan to look up all the possible literature on the subject to which I have access. Mr. Lyon, however, seems to miss the fact that it was not his personal test that I condemned in my paper, but the one described in the *British Pharmaceutical Codex*, so that if he has any grievance on this point he must not hold me responsible, but the Codex authorities. In his paper Mr. Lyon then proceeds to discuss the relative merits of his "benzol" test against my 0·720 ether test, and in order to vindicate my position I decided, if it were possible, to confirm the work that I had already done, and to make fresh investigations on the subject, the results of which I shall now describe.

First of all, let us consider what are the ideal conditions for extracting the free acid contained in bismuth salicylate. These are mainly—

(1) That the solvent employed must freely dissolve salicylic acid.

(2) That the solvent must not appreciably decompose the bismuth salt.

(3) That the solvent, if it is to be separated from the acid by evaporation, must have a low boiling-point.

In the monograph on salicylic acid contained in the *National Dispensatory* I take the following statement relating to solvents of the acid.

"Salicylic acid is soluble in 2 parts ether, in 80 parts chloroform, and in 80 parts benzene."

The following figures are taken from Seidell's *Solubilities of Inorganic and Organic Substances*—

Solvent.	Temperature.	Salicylic Acid dissolved per 100 Gm. solvent.
Ether	15° C.	50·5 Gm.
Acetone	23° C.	45·5 Gm.
Benzene	11·7° C.	0·46 Gm.
Ditto	64·2° C.	4·40 Gm.

From the above figures it would appear that at the ordinary temperature ether is a far superior solvent to 90 per cent. benzol, which, as its name implies, contains 90 per cent. benzene. The details of the test I described in my former paper are as follows—

Shake up 1 Gm. of the salt with 10 c.c. methylated ether, sp. gr. 0·720, filter, transfer the clear filtrate to a glass dish and evaporate off the ether on the water-bath. The evaporation should be carefully watched, and the dish removed just as the last traces of ether are passing off, to avoid the danger of loss of salicylic acid by volatilization. Treat the residue with 0·5 c.c. cold distilled water, and test with one drop of dilute ferric chloride in the usual way. At the end of the paper I also stated that " the merits of this test are further enhanced by the fact that the colorations obtained can be made use of quantitatively."

Now this method was not intended, originally, to be what I might describe as absolute, but as one that would be useful to buyers and manufacturers, with whom the saving of time is a matter of supreme importance. I shall, however, endeavour to show that for approximately quantitative results, its merits fully justify all I have claimed for it.

Let me here point out that the ether recommended in the test should be pure; the kind known commercially as Æther Purificatus, sp. gr. 0·720 (from methylated spirit) is preferable to the ordinary 0·720 methylated ether, and costs very little more.

There can be no question as to whether the spontaneous evaporation of the ether from the salicylic acid is better than driving it off on a water-bath. Here again, however, the saving of time cannot be overlooked, if the evaporation on the water-bath can be carried out *without reasonable loss of salicylic acid.* As there seemed to be some doubt when the paper was read as to what was meant by " removing the dish just as the last traces of ether are passing off," I should like to state here exactly how I accomplished this. The dish containing the ethereal solution of the acid is placed on a circular hole, one inch in diameter, cut out from a copper plate which covers one of the ordinary apertures of the steam-bath. The solvent is gently evaporated until the volume of the concentrated solution appears to just about cover the hole; the dish is then removed, and the rest of the ether allowed to evaporate spontaneously. In this way the danger of losing, by superheating, any salicylic acid that may be deposited on the sides of the dish is reduced to a minimum. It is scarcely necessary to emphasize the folly of evaporating down to complete dryness on the water-bath.

A solution was made up containing 0·05 Gm. salicylic acid per 100 c.c. of 0·720 ether; from this four weaker solutions were obtained by diluting 2 c.c., 1 c.c., 0·5 c.c., 0·2 c.c., to 10 c.c. with the same solvent. These were then evaporated in the manner above described, the residues dissolved in water, and the acid determined colorimetrically against a standard solution of salicylic acid with the following results—

Quantity of Salicylic Acid contained in Solution.	Quantity found in Residue.
0·001 Gm.	0·00095 Gm.
0·0005 Gm.	0·00048 Gm.
0·00025 Gm.	0·00025 Gm.
0·00013 Gm.	0·00015 Gm.

It is very desirable that some definite strength of solution of ferric salt should be generally adopted for the colorimetric determination of salicylic acid. I have found an aqueous solution of ferric chloride made by diluting 1 c.c. of Liquor Ferri Perchloridi Fortis, B.P., to 100 c.c. a very convenient one, but am quite willing to fall in with any better suggestion which may be offered. One drop of this weak solution is amply sufficient to combine with the free acid usually obtained from 1 Gm. of the bismuth salt; while three drops will bring out the maximum colour with 1 Mgm. of salicylic acid. The determinations are conveniently carried out in 50 c.c. Nessler glasses, and when these are used, the solutions should contain not more than 2 Mgms. per 100 c.c., if reliable results are to be obtained. The following results are quoted in support of the statement that the amount of free salicylic acid in bismuth salicylate can be approximately determined by a single extraction of 1 Gm. of the salt with 10 c.c. 0·720 ether.

Artificial mixtures were prepared containing 0·2, 0·1, and 0·05 per cent. by the addition of salicylic acid to bismuth salicylate taken from our manufactured stock. These were treated in the usual manner and the acid estimated colorimetrically.

I. Salicylic Acid added to 1 Gm. of the Bismuth Salt.	II. Amount obtained by one extraction with 10 c.c. 0·720 Ether.	III. Amounts in II. doubled after correcting for blank expt.
0·002 Gm.	0·0012 Gm.	0·0022 Gm.
0·001 Gm.	0·0006 Gm.	0·0010 Gm.
0·0005 Gm.	0·00029 Gm.	0·00038 Gm.
Nil.	0·00010 Gm.	—

The following are results obtained on samples of other well-known brands—

SAMPLE A.

I. Salicylic Acid added to 1 Gm. Bismuth Salt.	II. Amount obtained by one extraction with 10 c.c. 0·720 Ether.	III. Amounts in II. doubled after correcting for blank expt.
0·002 Gm.	0·00133 Gm.	0·00194 Gm.
0·001 Gm.	0·00081 Gm.	0·00090 Gm.
Nil.	0·00036 Gm.	—

SAMPLE B.

0·002 Gm.	0·00189 Gm.	0·00198 Gm.
0·001 Gm.	0·00145 Gm.	0·00110 Gm.
Nil.	0·00090 Gm.	—

SAMPLE C.

Nil.	0·00270 Gm.	—

It will thus be seen that after correcting for the blank the amount of acid extracted is practically one-half of that actually present. Since this test was first published I have found that some samples of bismuth salicylate, owing to their peculiar method of manufacture, do not settle well on shaking 1 Gm. with 10 c.c. ether, with the result that the volume of the filtrate is considerably reduced. I find, however, that approximately the same fraction of free acid is dissolved when 0·5 Gm. is shaken with 10 c.c. ether, and I now invariably employ this quantity of bismuth salt in order to make the test of more general application.

Although the above experiments show that a definite fraction of the uncombined acid is dissolved in this way, it is clearly obvious that a method of complete extraction, if that were possible, would be more satisfactory, and also that solvents other than ether might be as good if not better in this respect. The fact, however, must never be lost sight of that ether has comparatively a very low boiling-point. This naturally suggested the continuous extraction method by means of a Soxhlet apparatus, and in the following table are recorded the results obtained with ether and other solvents with the aid of this apparatus. In each case a mixture of 10 Gm. of bismuth salicylate taken from the same bulk, to which had been added 0·02 Gm. salicylic acid, was extracted. Each extraction lasted three hours, and in some instances, for obvious reasons, a final extraction was made with 0·720 ether. It may be interesting to record how the last traces of the solvents other than ether were expelled. The extraction being completed, the bismuth salt was removed from the Soxhlet and the solvent distilled off into the extraction apparatus until only a few c.c. remained in the flask below. About an equal quantity of 0·720 ether was then added to the residue of solvent with the object of lowering the boiling point. By gentle evaporation of the mixed solvents, repeating the process if necessary, and the final use of the vacuum pump, except in one case, no difficulty was experienced in removing the solvent.

Solvent used.	Amount of Acid obtained by First Extraction.	Amount obtained by Second Extraction.	Amount by Third Extraction.	Final Extraction with 0·720 Ether.	Remarks.
	Gm.	Gm.	Gm.	Gm.	
0·720 Ether . .	0·020	0·0028	0·0028	—	Extract, crystalline.
Petroleum Ether, B.P. below 60°C.	0·008	0·0008	—	0·007	Extract, gummy traces of yellow Bi_2O_3 in residue.
Acetic Ether. .	0·023	0·0170	0·0040	—	Extract, very gummy, and traces of Bi_2O_3 in residue.
Acetone . . .	0·020	0·0070	—	0·0027	Extract, very gummy, and traces of Bi_2O_3 in residue.
Chloroform . .	0·018	0·0013	0·0007	—	Extract, crystalline, no decomposition.
Benzol (90 per cent.)	—	—	—	0·0080	Extract, gummy, and traces of Bi_2O_3 in residue.

The above results were all obtained by a colorimetric comparison of the aqueous solutions of the residues (filtered if necessary) against a standard solution of salicylic acid.

The chief points to be noted are—

(1) The absolute agreement of the amounts of salicylic acid obtained in the second and third extractions in the case of ether. This shows that the extent of decomposition by this solvent, when applied in this manner, is constant.

(2) Excepting ether and chloroform, decomposition both of the acid extracted and also of the salt occurred to a greater or less extent with all the solvents tried.

(3) That the total amount of acid obtained by two extractions in the case of acetic ether, and also in that of acetone, considerably exceeded the quantity added.

(4) That petroleum ether is a comparatively poor solvent for salicylic acid, and that nearly as much acid was obtained in the final extraction with ether as in the first extraction by means of this solvent.

(5) That no result is recorded in the first extraction column in the case of 90 per cent. benzol, for, owing to its comparatively high boiling point, the last traces of solvent could not be removed in the manner above described. This solvent, therefore, cannot be recommended as an alternative for ether in any process in which it is separated from the acid by means of evaporation. It

is also noteworthy that the quantity extracted with ether after one treatment with benzol is nearly equal to the combined amounts of the two final extractions in the case of petroleum ether; therefore, *a priori*, we might reasonably assume that an amount equal to that obtained by the first extraction with petroleum ether would have been obtained by one extraction with 90 per cent. benzol.

(6) That the combined amounts obtained by three extractions with chloroform are exactly equal to the quantity of salicylic acid added, a fact which disproves the statements that have been made as to the unsuitability of chloroform as a solvent owing to its liability to decompose the bismuth salt.

The main conclusion to be drawn from a consideration of the above results is that of the solvents tried ether and chloroform are undoubtedly the most suitable. Of these ether has perhaps the advantage, requiring only one-third of the time taken by chloroform to extract the whole of the salicylic acid, for although it decomposes bismuth salicylate to a greater extent than chloroform, this can be corrected for, as the amount of decomposition is constant.

I now give the results obtained by what I had hoped to put forward as an "absolute" method of determining free salicylic acid in bismuth salicylate, but which, unfortunately, as will be seen, proved to be not generally applicable. In this process the evaporation of the solvent is entirely obviated, and consists in extracting the salt with the aid of a Soxhlet by means of ether or chloroform, removing the acid from the solvent by shaking into a known volume of standard alkali solution, carefully neutralizing to litmus by means of standard acid, and estimating the salicylic acid colorimetrically in the usual way.

The following results were obtained on a mixture of bismuth salicylate containing 0·4 per cent. added salicylic acid, 10 Gm. being extracted in each case—

Solvent.	Acid obtained in Three Hours by First Extraction.	Amount in Three Hours by Second Extraction.	Amount in Three Hours by Third Extraction.
0·720 Ether . . .	0·0385 Gm.	0·0028 Gm.	0·0028 Gm.
Chloroform . . .	0·0362 ,,	0·0032 ,,	0·0015 ,,

Results obtained on samples of other manufacture to which reference has been already made. In each case 10 Gm. were extracted—

Sample C. Solvent.	Acid obtained in Three Hours by First Extraction.	Amount in Three Hours by Second Extraction.	Amount in Three Hours by Third Extraction.
0·720 Ether. . .	0·1120 Gm.	0·0100 Gm.	0·0035 Gm.
Sample A.			
0·720 Ether. . .	0·6840 ,,	0·8440 ,,	0·6000 ,,
Sample B.			
0·720 Ether. . .	0·4400 ,,	0·2500 ,,	0·2240 ,,

It will be noticed that in the case of the bismuth salt not specially designated, and also in the case of sample "C," the extent of decomposition by 0·720 ether, when treated in this way, is constant, amounting practically to 0·03 per cent. With reference to samples "A" and "B," in both cases the extent of decomposition by the solvent is very considerable, and bears no apparent relation to the results obtained by the cold method of extraction recorded earlier in this paper. Results of much the same order were obtained with sample "A" when chloroform was used as the solvent in the "absolute" method. It will be further noticed in the case of sample "C" that the cold method of extraction does not yield reliable results, *when the amount of free salicylic acid is at all considerable*, for one extraction by this method indicated the presence of 0·54 per cent. free acid, while nine hours' continuous extraction by means of the Soxhlet yielded 1·23 per cent. salicylic acid.

These results undoubtedly lead to the conclusion that different methods of preparation are being used by manufacturers of bismuth salicylate, and that there are on the market at least two distinct products, one approximating to a true salt of salicylic acid, the other to a combination of the acid and base more or less loosely combined, so that under these circumstances the *exact* determination of free acid is, to say the least, a matter of extreme difficulty. The question thus arises as to whether, from a therapeutic standpoint, there is any advantage to be gained by using either of these products in preference to the other. In prescribing bismuth, the salicylate is chosen in preference to the other salts with the object of combining the astringent properties of the base with the antiseptic properties of the salicylic acid, and undoubtedly under these circumstances the action of the salicylic acid is meant to be of secondary importance compared with that of the bismuth.

Cushny, reviewing the action of the antiseptics of the aromatic series in his standard work on pharmacology and therapeutics, states: "Any drug used for the disinfection of the intestine must not be irritant or very poisonous. It must not be too soluble, since otherwise it may be absorbed from the stomach and fail to reach the bowel, and on the other hand, it must be soluble to some extent, or it cannot mix very intimately with the contents of the intestine. . . . Salol and its congeners have the advantage of being almost completely insoluble and harmless in the stomach, and of being dissolved and rendered active by the intestinal juices, and have been found of value in excessive putrefaction of the contents of the bowel."

In view of the above remarks of this well-known authority, it would therefore appear that the antiseptic properties of salicylic acid are meant to be developed in the bowel rather than in the stomach, and that a salicylate which is not too readily decomposed possesses undoubted advantages therapeutically over a loose combination that is split up readily. On the other hand, if it is immaterial whether bismuth salicylate, when taken internally, is readily split up or otherwise, then why all this unnecessary fuss about the *relatively small quantities* of free salicylic acid that are often found in this compound?

In conclusion, I beg to express my indebtedness to Messrs. Howard and Sons, Limited, in whose laboratory this work was carried out, for permission to publish the results contained in this paper.

Mr. TYRER said like Mr. Howard he had had experience in the manufacture and manipulation of bismuth salicylate. Mr. Harrison's paper was a satisfactory research on the subject, and he would like to say that the paper was of a kind that would do credit to the Conference for its utility. He thought some of the points in the paper were open to criticism, and, if he had access at the moment to some notes which he had made, he would be able to show that Mr. Harrison carried things a little too far. He had looked up the *Year-Book* of 1908 and found that Mr. Howard, in replying to some remarks of Mr. Hill, said he agreed with Mr. Hill that it would be necessary that methylated ether should be pure, provided it was "really 0·720." The pharmacist might very easily be misled. It was of the very essence of that particular method that the ether should be pure, and nobody knew better than Mr. Howard and Mr. Harrison what ether should be. It was a very rare thing to find commercial ether really 0·720. There had been discussion lately about ether, and it was still not an easy matter to make 0·720 ether. The specific gravity was by no means a satisfactory indication. For ordinary commercial purposes, it was not of very great moment; but when they came to the value of a test which was to be adopted by the scientific pharmacist and the public analyst, and by those who had the training of medical men, and in the interests of the public, then a careful definition of terms was very desirable, and he wished to simply record his opinion that it was not the easiest thing in the world to get 0·720 ether which was free from both alcohol and water. Therefore, for the purposes of that argument, he thought the word methylated might be eliminated altogether. He would remind them that the historic work of Squibb had not been improved upon in the slightest degree by any work that had been done since his time, and one was obliged to refer to Squibb for the most valuable suggestions and complete history and conclusions with regard to ether, and he specifically proved that it was difficult to get a 0·720 ether without alcohol on the one hand or water on the other. In his own laboratory he used the benzol test. Of course there was benzol and benzol.

Dr. G. Coull said he did not rise to criticize in any way, but simply to congratulate Mr. Harrison on the very complete and excellent manner in which he had treated the subject. There was one point, however, mentioned by Mr. Howard that he would like to emphasize, and he wished more were made of it. While one of the functions of the Conference was to maintain uncompromisingly the purity of drugs and chemicals used in medicine, it must not be forgotten that the elimination of a very small amount of a harmless impurity often enormously increased the cost of a chemical. He was glad to see that fact mentioned by such experts. He himself thought that when a chemical was prepared of a certain satisfactory degree of purity for medicinal use, any further attempt at getting rid of mere traces of a harmless impurity was of no utility.

The President, in thanking Mr. Harrison for his interesting contribution, said that from the retail pharmacist's point of view, the lesson they had to learn was not to use ordinary commercial ether for testing purposes, but rather to use ether which had been thoroughly purified—the pharmacist had to purify his ether before applying his tests. It was not quite clear to him why chloroform should not be used, since it could be prepared practically pure and was a good solvent of salicylic acid; but the difficulties encountered in using ordinary ether, due to the presence of alcohol on the one hand and water on the other, were real difficulties, which could be got rid of by purification of the ether.

Mr. HOWARD, in replying, said he was very much obliged for the very kind and sympathetic discussion which had taken place on the paper. With regard to Dr. Coull's remark, he knew he was treading on delicate ground, and did not wish to go too far. What he really wished to say was that there came a point when it ought to be left to the expert in therapeutics rather than to the manufacturer to say whether the additional cost was worth the additional benefit. With regard to the President's remarks, chloroform had been shown to be a reliable solvent, but the principal objection to its use was that it was very much slower than ether in its action.

UNGUENTUM PARAFFINI.

BY J. H. FRANKLIN.

Probably no ointment introduced into the more recent of the British Pharmacopœias has given so much trouble and dissatisfaction as the paraffin ointment at present official. Various suggestions have been made for improving it, such as rubbing it through a sieve or forcing it through muslin, but in most cases the remedy suggested is messy and troublesome, and the resulting product still unsatisfactory. The difficulty with this preparation appears to arise from the imperfect blending of the petroleum jelly and paraffin wax. Any quantity of hard paraffin up to about 12 per cent. mixes fairly well, but when this quantity is exceeded the well-known curdy and granular character appears, and becomes much more marked as the percentage of paraffin wax approaches the quantity recommended in the Pharmacopœia. When you exceed 12 to 15 per cent. of paraffin the advantages are outweighed by the disadvantages, there being no corresponding increase of consistency to balance an increased quantity of the harder substance, and we are thus compelled to conclude that petroleum jelly and paraffin wax are almost incompatible, or at least that paraffin is not a suitable hardening agent in the quantity required to produce an ointment basis with the necessary body. The British Pharmaceutical Conference Research List has for several years contained the following: "An improved basis is wanted to replace Ungt. Paraffin., B.P., the physical characters of which are unsatisfactory," and the following simple experiments constitute an attempt to supply that want, although the selection of hard substances suitable to replace paraffin wax is very limited indeed.

Five per Cent. Series.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
White petroleum jelly . . .	95	95	95	95	95	95	95	95
Paraffin wax, m.p. 120°F. . .	5							
Paraffin wax, m.p. 130°F. . .		5						
Paraffin wax, m.p. 140°F. . .			5					
Commercial bleached ceresin .				5				
Pure bleached ceresin. . . .					5			
Commercial bleached carnauba .						5		
Pure yellow carnauba . . .							5	
White beeswax								5

It was not expected that any of the above would produce an entirely satisfactory ointment, but from previous experience it was fully expected that the experiments would throw some light on the subject, and perhaps be a guide to a satisfactory formula. The results show that ceresin is better than paraffin, and bleached carnauba still better than ceresin, paraffin being the most unsatisfactory of all the hardening agents tried. No. 6, made with bleached carnauba, is the smoothest, whitest, and firmest of the series.

Ten per Cent. Series.

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
White petroleum jelly . . .	90	90	90	90	90	90	90	90
Paraffin wax, m.p. 120°F. . .	10							
Paraffin wax, m.p. 130°F. . .		10						
Paraffin wax, m.p. 140°F. . .			10					
Commercial bleached ceresin .				10				
Pure bleached ceresin. . . .					10			
Commercial bleached carnauba .						10		
Pure yellow carnauba . . .							10	
White beeswax								10

The result of these experiments confirmed the results obtained in the previous series—viz., that ceresin gives a firmer, whiter and smoother ointment than paraffin, but No. 14, made with bleached carnauba, is superior to all the others.

FIFTEEN PER CENT SERIES.

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
White petroleum jelly . . .	85	85	85	85	85	85	85	85
Paraffin wax, m.p. 120°F. . .	15							
Paraffin wax, m.p. 130°F. . .		15						
Paraffin wax, m.p. 140°F. . .			15					
Commercial bleached ceresin .				15				
Pure bleached ceresin. . . .					15			
Commercial bleached carnauba .						15		
Pure yellow carnauba . . .							15	
White beeswax								15

The ointments containing paraffin are difficult to stir down, whilst the ointments made with ceresin and bleached carnauba stir down fairly easily. Nos. 20, 21, and 22 are good ointments, firmer, whiter, and smoother than any formula tried, No. 22 being the best, and thus confirming previous observations. No. 23 contained hard particles and was abandoned.

TWENTY PER CENT. SERIES.

	(25)	(26)	(27)	(28)	(29)	(30)	(31)
White petroleum jelly	80	80	80	80	80	80	80
Paraffin wax, m.p. 120°F. . . .	20						
Paraffin wax, m.p. 130°F. . . .		20					
Paraffin wax, m.p. 140°F. . . .			20				
Commercial bleached ceresin . .				20			
Pure bleached ceresin.					20		
Commercial bleached carnauba . .						20	
White beeswax							20

No. 28 is probably the best of this series, but there is little difference between 28, 29, and 30, and generally the ointments are not equal to the 15 per cent. series. It should be noticed that the ointments prepared with 20 per cent of ceresin and bleached carnauba are not as firm as similar ointments prepared with 15 per cent. of the same hardening agents, showing (as is the case with paraffin) that much over 15 per cent. does not work satisfactorily, and also that after a certain point you do not get a corresponding increase of consistency for a corresponding increase of the hard waxes, the explanation being that immediately the two substances cease to blend together you get a less homogeneous product with loss of body. All the experiments enumerated were tried on 5-oz. quantities.

Having now practically established formulae distinctly superior to the official, and containing about 15 per cent. of commercial bleached carnauba or pure ceresin, it was decided to try if the best of them were workable in batches of 100 oz., and at the same time to select the exact formula to be adopted and also to ascertain if the chosen ointment could be cooled by artificial means when a fair-sized batch was made.

	(32)	(33)	(34)	(35)
	oz.	oz.	oz.	oz.
White petroleum jelly	90	87½	85	82½
Pure bleached ceresin	10	12½	15	17½

	(36)	(37)	(38)	(39)
	oz.	oz.	oz.	oz.
White petroleum jelly	90	87½	85	82½
Commercial bleached carnauba .	10	12½	15	17½

The above were made as nearly as possible under identical conditions, and the earlier results confirmed. Nos. 32, 33, 36, and 37 are rather soft, 39 is slightly granular, but 34, 35, and 38 all make excellent substitutes for Ung. Paraffin., B.P., 38 being the best. Unfortunately, pure bleached carnauba wax is not on the market, and we are compelled to use the commercial bleached product, which is a mixture of carnauba and other waxes; and, altogether, formula No. 38 gives an ideal, white, firm, smooth, plastic, and homogeneous ointment, which is readily spread on lint with a spatula, and is, in fact, everything that can be desired for paraffin ointment. It keeps well, and does not show signs of separation in eighteen months, and can easily be made in any pharmacy. Moreover, it can be cooled by artificial means, which is a very important point. Although the ointment has such high qualities I am reluctant to recommend it on account of the irregularity in the composition of the wax as supplied by different makers.

A large number of samples with mixtures of waxes was next tried with the object of getting a basis having the same physical characters as No. 38, and the following alternative formulae are suggested to replace the unsatisfactory official product—

"A"	White petroleum jelly	85 parts.
	Pure bleached ceresin	15 ,,
"B"	White petroleum jelly	84 parts.
	Paraffin wax, m.p. 130°F.	6 ,,
	Pure bleached ceresin	10 ,,

Melt together, strain if necsssary, allow to cool, then stir constantly till cold, stirring briskly at the end. Both of the selected formulae are perfectly satisfactory, possessing all the good qualities of No. 38, but not in such a marked degree. "B" is the whiter basis, but "A" is rather smoother and not so greasy on the skin, and on the whole is preferred, on account of its jelly-like character, although either can be thoroughly recommended. The object of using paraffin in formula B is simply to get a whiter basis, as it was noticed that when mixed with ceresin it gave a more opaque ointment. My thanks are due to Mr. J. H. Ridgway, of the staff of Messrs. J. Woolley, Sons, and Co., Limited, for generous help in preparing the numerous samples.

Mr. Alcock hoped that when small quantities of this ointment were ordered to be made, it would not be suggested to press it through muslin, and in this connexion he would refer to what he had seen at the establishment of a dairy company, where, in sterilizing milk, the fat formerly settled out in varying sized lumps, but now the whole was forced under high pressure through a cylinder armed with very fine meshed diaphragms, giving a product homogeneous, and which then like goats' milk does not form a cream. Since the author has recommended additions to the soft paraffin which must have been submitted to heat, therein lies a wrinkle. If the hard paraffin, which may be obtained in wide degrees of melting-point, were submitted to the action of heat for some time to be subsequently decided upon, it may prove to be a useful suggestion for addition. It must be remembered that the source of hard paraffin and that of soft paraffin is not the same, and the physical, natural, and indeed chemical character, are not the same, the former being obtained from shale and the latter from petroleum ; hence, perhaps, the difficulty of blending. The speaker had tried this effect of heating and cooling, and had observed as most had that such a process modified in a marked degree the character of the substance heated, especially as regards its melting-point and power to mix with other similar substances. He asked the author whether it was not a fact that this ointment was the only one which the B.P. stated should be plastic, and he inquired why this was, as it appeared to him a curious thing that this ointment alone should have been singled out of all the others to possess the property of plasticity.

Dr. SYMES said he was surprised to learn that the carnauba wax was adulterated or bleached. The natural product varied very considerably in colour from grey to a lightish yellow (something like cacao butter). As the result of some experiments made some years ago, he found that by the addition of 5 per cent. of this substance to cacao butter in hot weather in preparing suppositories they could be handled more easily. The melting-point was not increased sufficiently to be in any way injurious. He felt sure there must be a wider sphere of usefulness for this wax, and he believed it was used more than formerly, because the commercial price had more than doubled.

Mr. H. FINNEMORE said this was a fundamental ointment, and therefore any work on this was of a corresponding value. He was sorry that Mr. Franklin had not recommended the definite adoption of No. 38, which he had found to be the best, because of the lack of purity of the carnauba wax, for if the demand arose, a pure form of the wax would be introduced into the Pharmacopœia.

Mr. NAYLOR said if there was a demand for pure carnauba wax he thought it would be very quickly met. It was very largely used in a particular industry. So far as his knowledge went, the quite white wax was not of any commercial use. Mr. Alcock had made some reference to a method of preparing ointments. There was a method of making ointment by forcing it through a diaphragm with a very fine mesh, and the result was that it was of a uniform consistency. Probably that was one of the best methods of preparing ointments for pharmaceutical use. He would like to ask Mr. Franklin whether he had kept these ointments for any considerable time, and if so, whether they retained their original consistency.

Mr. WHITE said he understood Mr. Alcock to say that soft and hard paraffin were similar bodies. He did not think that was quite right. Paraffins made from petroleum were soft up to a certain point. There was a considerable gap between the highest member of the vaseline series and the lowest paraffin wax. Paraffin wax began at a higher point. He found, if he insisted on it, he could get a soft paraffin of a considerably higher melting-point than mentioned in the Pharmacopœia, and it was fairly hard in hot weather.

The PRESIDENT briefly thanked Mr. Franklin for his valuable contribution, and

Mr. FRANKLIN, in replying, said, referring to Mr. Alcock's remarks, he certainly did not intend to recommend any formula. He had forgotten that the Pharmacopœia said that it must be a plastic ointment. His ointment was remarkably plastic. He thought what was wanted was an ointment that could be applied to wounds without the addition of an antiseptic. The idea underlying the whole thing was having a simple formula that could be made up in any pharmacy, and that object he was quite certain he had achieved. With regard to ceresin, that certainly had a higher melting-point, something like 110°. It resembled a very fine sample of fine lard, and the melting-point was about 10 per cent. higher than the one in the Pharmacopœia. With regard to the point raised by Dr. Symes, it was wrong to say that the carnauba wax was adulterated; it was simply diluted for putting on the market. He did not think it was very largely used in pharmacy, but it was of immense use outside pharmacy. It was simply adulterated to permit it being put on the market in a white form. It was a remarkably useful wax, and he would be very glad to see it come into use in pharmacy. The reason he did not recommend it for making this particular ointment was on account of its variability. In regard to the keeping properties of the ointment it was practically perfect. He had kept it for nearly two years, and it retained its original melting-point and had not separated.

NOTE ON FLUID EXTRACT OF CASCARA SAGRADA.

BY CHARLES SYMES, PH.D.

So much has been done and written on cascara sagrada and its preparations that one hesitates to add anything thereto without making considerable investigation and devoting much time to the subject. Yet, so long as there is a preparation possessing or supposed to possess greater medicinal value than that of the Pharmacopœia it is not to be supposed that the last word has been said, or that a note as the result of observation and limited experiment in daily working will be unacceptable to the practical pharmacist.

In the B.P. process the point of exhaustion is usually determined by the absence of bitterness in the percolate. In practice we use chloroform water instead of plain water, to avoid any tendency to fermentation, and allow the maceration to continue for at least twelve hours before starting percolation.

In working a small batch of 28 lb. of bark a short time since it occurred to me that when bitterness of the percolate had ceased the addition of ammonia to a further portion of the menstruum may be the means of obtaining a further yield of extract possessing medicinal value. To a further 2 gallons of chloroform water 10 oz. of Liq. Ammonia, B.P., was added, and percolation continued. The percolate was collected separately from that previously obtained, and when evaporated to 16 fl. oz. it yielded a fluid extract which possessed distinct aperient properties. To the first percolate 2 pints of glycerin were added during the process of evaporation, as is our custom, and this latter extract was added to the resultant product before adding the dilute alcohol, to make up the quantity of 28 fl. lb. On repeating the process at a subsequent date similarly satisfactory results were obtained. Cascara bark, like all natural products, varies to some extent in character and activity, but given two samples of fluid extract prepared from two portions of the same grinding of bark, that resulting from the process I have indicated will possess greater activity and will represent more completely the medicinal constituents of the bark than that obtained by the B.P. process. Long contact with an alkali is known to reduce the bitterness and also the activity of cascara, and for this reason I have not thought it desirable to use ammonia from the commencement of the process.

Mr. Alcock asked whether the preparation which Dr. Symes handed round contained any ammonia. He could not see why chloroform should be used when the B.P. did not allow it, nor why ammonia should be used. He, therefore, suggested that the title of the paper should be "'A' Fluid Extract of Cascara Sagrada." In this connexion he would like to refer to the preparation in which liquor potassae and other hydroxides were used to render this preparation more agreeable to the public, and to say that although almost all hydroxides would be available for this purpose the hydroxide of hydrogen was one to be reckoned with under certain conditions, and would be much safer than many which have been recommended. The position of water in this connexion was very important, as is understood when we recalled the difference between hay and grass, and that of *fresh* digitalis, valerian, and other drugs when compared with the *dried* preparations as required in pharmacy.

Dr. Symes, in reply to Mr. Alcock, said no ammonia and no chloroform remained in the product ; both were dissipated during evaporation. He had used the Pharmacopœia formula, and it had occurred to him that with the addition of ammonia one could get a further amount of extractive. He made the experiment and found that was the case, and the extract possessed aperient properties, although, as far as could be ascertained, not equal to that of the first product. It was bitter and somewhat more astringent, but not being so active as the first product, the process would not be an advantage in preparing the solid, because although they might get a larger amount it would not be quite as active. For the fluid extract, however, any gain in the way of medicinal extract was a gain in strength. It was only with an idea of carrying that out that he made the note on the subject. He found what he expected to be the case, that the finished product was more active. The obtaining of satisfactory physiological tests was very difficult. Out of a dozen pills *one* might prove very effective, and another not so, and therefore although such tests were valuable, they must remember the factors were not constant. The condition of the patient varied.

The President thanked the author for his useful note.

NOTE ON CACAO BUTTERS AND CACAO BUTTER SUBSTITUTES.

By W. B. Cowie, Ph.C., F.C.S., and B. M. Brander.

During the past year we had to examine two cacao butter substitutes ; one of them was so skilfully prepared that it answered most of the tests for genuine cacao butter, whilst the other might have been rejected on any single test. It occurred to us that it would make an interesting note to compare these substitutes with a genuine cacao butter and one prepared from cacao husk.

Björklund's ether test was used as a preliminary, and the results obtained are—

Sample.	Cooled to 0°C. for 3 Minutes.	Clear at 0°C.
No. 1.—Genuine cacao butter	No deposit	15°C.
,, 2.—Husk cacao butter	No deposit	14°C.
,, 3.—Hard cacao butter substitute	Flaky deposit	15°C.
,, 4.—Soft cacao butter substitute	Slight deposit	21°C. (still cloudy)

These results indicate that No. 3 contains some bodies of a relatively high melting-point, and that No. 4 probably contains animal fats.

The following table contains the results of the various determinations carried out—

Sample.	Melting-point in 0°C.	Refractive Index at40°C.	Acid Value.	Saponification Value.	Iodine Value.	Reichert-Meissl Value (C.c.KOH).
No. 1.—Genuine cacao butter	32·2–33·3	1·4565	1·4	195	33·2	0·2
No. 2.—Husk cacao butter	30·6–31·1	1·4570	7·8	197	35·3	0·6
No. 3.—Hard cacao butter substitute	36°–37°	1·4571	0·7	194	33·4	0·5
No. 4.—Soft cacao butter substitute	30·5–31·1	1·4520	0·7	249	8·5	3·8

It will be seen that the numbers obtained with genuine cacao butter are all well within the recognized standards, and, as might be expected, the husk butter has a low melting-point, probably due to it having been extracted with a solvent, and, probably for the same reason, its acid value is high. The other numbers are higher than those of the genuine cacao butter, but are still within the standards.

In the case of No. 3, which is a hard cacao butter substitute, it is most remarkable that all the numbers obtained in the range of tests are within the standard figures, excepting the melting-point. In the case of No. 4, which is a soft cacao butter substitute, all the numbers are abnormal except the acid value.

The free fatty acids were prepared from the samples, and their melting-points and refractive indices determined—

Sample.	Melting-point.	Refractive Index at 60°.
No. 1.—Fatty acids from genuine cacao butter .	50·5°C.	1·4400
,, 2.—Fatty acids from husk cacao butter . .	50°C.	1·4406
,, 3.—Fatty acids from hard cacao butter substitute	56·5°C.	1·4423
,, 4.—Fatty acids from soft cacao butter substitute	28°C.	1·4298

There is a remarkable difference between the melting-points of the free fatty acids obtained from the "hard" and "soft" substitutes as compared with those of the unsaponified substitutes, and this is a test of considerable importance in the examination of mixed fats.

No. 1 yielded a trace of unsaponifiable matter. No. 3 yielded 1·3 per cent. of an unsaponifiable vegetable wax, and it is so skilfully built up that it is very difficult to say what its chief components are, and it is all the more remarkable that only the B.P. tests show that it is not a genuine cacao butter.

By the saponification and iodine values it is clearly indicated that No. 4 consists chiefly of coco-nut stearin.

PRELIMINARY NOTE ON THE REFRACTOMETRIC EXAMINATION OF GALENICAL PREPARATIONS.

By W. B. Cowie, Ph.C., F.C.S., and T. O. Broadbent.

In the determination of the extractive matter in galenical preparations the first question that comes home to the inquiring operator is: What proof is there that the extractive obtained is free from extraneous matter? This question is difficult; in fact, practically unanswerable. It occurred to one of us that the determination of the refractive index of such substances would be very useful for the detection of adulteration. We fixed upon liquid extract of cascara for the purpose, and we prepared a standard liquid extract strictly according to the method published in the report of the Reference Committee in Pharmacy to the Pharmacopœia Committee. We also obtained several samples of well-known commercial liquid extracts, in each of which the specific gravity, alcohol extractive and refractive index were determined.

For the determination of the refractive index 10 mils of the extract are evaporated to one-half, cooled, 2·5 mils of alcohol

90 per cent. added, and made up to the original volume at 15·5°C. with water ; 5 mils are now diluted to 25 mils with 25·5 per cent. alcohol at 15·5°C. The diluted extract is now ready for placing in the refractometer. We found the 1 in 5 dilution work best, but this is a matter which depends upon the depth of colour in the extractive. We used Abbe's refractometer. The results obtained are—

Samples.	Specific Gravity at 50·5°C.	Extractive at 100°C. Per cent. w/v.	Alcohol by vol. Per cent.	Refractive Index at 20°C. (exts. diluted 1 to 5 with 22·5 per cent. Alcohol).
No. 1 Standard (own make)	1·070	25·8	22·5	1·3560
No. 2 . . .	1·077	37·0	27·8	1·3565
No. 3 . . .	1·064	22·7	17·17	1·3530
No. 4 . . .	1·202	25·8	Nil	1·3670 (glycerin 40%)
No. 5 . . .	1·180	Not determined	Nil	1·361 (glycerin % ?)

No. 1 has a deep reddish colour compared with the others, and this is particularly pronounced in the refractometer, where colours are easily compared. No. 4 was made in the same manner as No. 1, freed from alcohol, and made up to its original volume with glycerin (contains 40 per cent.). No. 2 is a well-known high-priced commercial liquid extract. No. 3 is also a well-known commercial liquid extract. No. 5 is a well-known glycerin liquid extract. It will be seen that the refractive index of each agrees with the specific gravity and amount of extractive.

Comparing the first, second, and third, we find that No. 2 is the highest, No. 1 next, and No. 3 is the lowest. Nos. 4 and 5 contain glycerin, and cannot be compared with the others ; the refractive index of the glycerin used is 1·472 at 20°C., whilst the refractive index of the 22·5 per cent. alcohol used is 1·3575 at 20°C.

Mr. Naylor said he felt sure they would all agree that Mr. Cowie's paper opened up quite a new line. When they were evaporating a solution, they did not really know that they had got the solid matter at the end in the basin in the same form in which it existed in the drug. That was one of the things they wanted to know. He was simply delighted with the paper, and he thought there were very great possibilities in the process suggested by Mr. Cowie.

The following papers were read in abstract by Mr. Edmund White.

A PRELIMINARY EXAMINATION OF EUPHORBIA PILULIFERA.

By J. Stableford Hill,

Pharmaceutical Chemist.

Moisture, about 5 grammes of the drug in fine powder maintained at 110°C. until of constant weight. Average of three lots, 8 per cent.

Ash, average yield of three lots on two samples of the drug, A, 8·5 per cent.; B, 8·2 per cent.

Test for Alkaloid.—20 grammes of the drug in fine powder were exhausted with Prollius' fluid, the solution evaporated down to low bulk and the residue treated with water acidulated with H_2SO_4; the acid solution filtered into a separating funnel and washed with ether; the acid solution made alkaline with a slight excess of NaOH, and shaken out with a mixture of three parts ether and one part of chloroform; the ethereal solution evaporated to dryness, and the residue dissolved in 20 mils of 0·2 per cent. solution of H_2SO_4, and small portions of this solution tested with the usual alkaloidal reagents. Thresh's reagent and Mayer's reagent both yielded characteristic alkaloidal precipitates.

Extraction with Different Solvents.—10 grammes of the finely powdered drug were exhausted in a Soxhlet apparatus with the following solvents in the order named: Petroleum spirit (boiling-point below 45°C.), dry ether (0·717), chloroform, purified acetic ether, and absolute alcohol; the resulting solutions evaporated and residues dried until of constant weight—

	Per cent.	
Petroleum spirit extracted	1·67	Calculated upon the dry drug.
Ether extracted	1·67	
Chloroform extracted	0·58	
Acetic ether extracted	2·66	
Absolute alcohol extracted	11·15	
Total extractive	17·73	

The extract from petroleum spirit was a pale yellowish-green waxy solid, somewhat crystalline, and resinous to the touch. It melted to a clear liquid. Melting point, not sharply defined, from 55° to 68°C. It had no odour. The ether extract was yellowish-green and resinous, and showed numerous small pale yellow nodular masses. The chloroformic and acetic ether extracts were dark green and resinous. The alcoholic extract was dark, almost black, and resinous.

For a more thorough examination, 1,000 grammes of the powdered drug were exhausted by slow percolation with cold 90 per cent. alcohol and 10 litres of solution obtained. 100 mils of this solution evaporated to dryness, and the residue dried until of constant weight, gave 12 per cent. of extractive, soluble in 90 per cent. alcohol, calculated upon the dry plant. After evaporation of the alcohol from the remainder of the solution the residue was thrown into a large quantity of water, when a soft, sticky, dark green resinous mass separated. This was filtered off and the residue washed, the washings being added to the filtrate. 100 mils of this filtrate evaporated, and the residue dried to constant weight, indicated that 56·3 per cent. of the alcoholic extract was water soluble. This aqueous solution, further tested, gave a blue-black precipitate with ferric chloride, a white precipitate with neutral lead acetate, but no coloration with potassium cyanide, indicating presence of tannic acid. The remainder of the aqueous solution was evaporated on a water-bath to a low bulk and set aside for further examination. The soft green resinous mass was next dried in an exhausted desiccator over strong sulphuric acid, and 35 grammes of the dried mass mixed thoroughly with fine sawdust (previously extracted in a Soxhlet apparatus with petroleum spirit, ether, absolute alcohol, water, and again absolute alcohol). The mixture was then extracted in a Soxhlet apparatus with solvents in the order named, and the extracts evaporated to dryness and dried in a water-oven yielded—

I.	Petroleum spirit . .	23·23	grammes,	or 66·37	per cent.
II.	Dry ether (0·717) .	4·02	,,	,, 11·48	,,
III.	Chloroform . . .	1·54	,,	,, 4·40	,,
IV.	Acetic ether . .	1·12	,,	,, 3·20	,,
V.	Absolute alcohol .	3·33	,,	,, 9·51	,,
	Total	33·24	,,	,, 94·96	,,

Residue No. I was a dark green viscous liquid, evidently containing much chlorophyll. Nos. II, III, and IV were brittle, green, and resinous. No. V was a brown resin. Further examination of these extracts is in progress. The marc left after percolation with 90 per cent. alcohol was dried and percolated slowly with cold water until the percolate was almost colourless. This percolate is also reserved for further examination. The results of the examination so far indicate the presence of a small quantity of alkaloid, tannic acid, a waxy substance, several resins, but no volatile oil. I hope to report later upon the nature of these substances.

NOTE ON THE SEPARATION OF STRYCHNINE FROM BRUCINE.

By G. Pinchbeck, F.C.S.,
Pharmaceutical Chemist.

Since the adoption of Gordin's modification (*J. C. S.*, Abstr., 1903, 11, 342) of Keller's nitric acid process by the United States Pharmacopœia authority for the assay of strychnine in nux vomica and its preparations, notes have appeared by Mann (*Laboratory Report*, 1906, Southall Bros. and Barclay, pp. 31-32), Wright and Farr (*Year-Book of Pharmacy*, **1906**, p. 226), and other workers, showing that if the prescribed conditions are rigidly adhered to the reagent has little if any action on the brucine. The process referred to is as follows: The mixed alkaloids are extracted and dissolved in 15 mils of sulphuric acid (3 per cent.), 3 mils of a cooled mixture of equal volumes of nitric acid (D. 1·42) and distilled water are added, and the whole set aside for exactly ten minutes. The mixture is then made alkaline, and extracted with chloroform. My investigation of this process is in accord with these workers, and for comparative purposes is tabulated here—

Investigator.	Alkaloid taken.	Alkaloid recovered.	Remarks.
Wright and Farr	Brucine, 0·084	0·0767	—
Pinchbeck* . .	Brucine, 0·075	0·0695	Characteristic red colour feebly developed
Mann	Brucine, 0·05 Strychnine, 0·05	Strychnine (?) 0·098	Ditto.

* Note in this experiment colourless B.P. acid only was used.

The variable colour effect produced by nitric acid on brucine at the ordinary temperature of the laboratory is, in my opinion, due in no small measure to the degree of dilution and to the amount of nitrogen peroxide present. It is known that nitric acid is slowly and partially decomposed by sunlight, giving nitrogen peroxide, oxygen, and water; and that even when kept under the best of conditions in the laboratory slowly becomes yellow and contains hyponitric acid. Further, Reynolds and Sutcliffe (*J.S.C.I.*, 1906, **25,** 512-515) have shown that a solution of pure nitric acid containing 50 Gm. per 100 mils, obtained by treating nitric acid with minute traces of sodium peroxide or barium peroxide, so as to remove traces of nitrous acid, did not act even on standing for several hours. It has also been experimentally determined that the addition of half a mil of a solution containing 0·1 per cent. of sodium nitrite would stimulate an experiment which was colourless and completely destroy the brucine in ten minutes. The action of nitrous acid has not been ascertained, but may be compared to the behaviour of the trace of water vapour necessary to bring about the combination of some gases by the electric spark. This property of nitrous acid is apparently taken into consideration in the modification of the official American test by Webster and Purcell (*Amer. J. Pharm.*, 1907, **79,** 1–7), who propose the addition of a little sodium nitrite. More recently Lyons (*American Druggist and Pharm. Record*, March 8, 1909) has suggested the addition of a little cane sugar with the same object in view.

After a considerable amount of experimental work in this direction I have found excellent results could be obtained by the employment of a solution of nitrogen peroxide in nitric acid instead of ordinary nitric acid (D. 1·42). The solution is prepared by diluting commercial fuming nitric acid with commercial white nitric acid in such proportion as to contain 1 per cent. of nitrogen peroxide, N_2O_4. and not less than 70 per cent. of real HNO_3. This acid is obviously a more powerful oxidizer than ordinary nitric acid. On addition of the acid to an aqueous solution of brucine a characteristic red colour is immediately developed. The depth of the colour, which may be taken as an indication of the rate of oxidation, is developed to a greater degree than ordinarily, and is in all probability due to the nascent nitrous acid produced by the partial hydrolysis of the nitrogen peroxide, as shown by the following equation—

$$N_2O_4 + H_2O = HNO_2 + HNO_3.$$

In the course of the investigation experiments were conducted to ascertain the oxidizing action of the solution of nitrogen peroxide in nitric acid on brucine and strychnine alone and on mixtures of the two. A weighed quantity of the alkaloid or alkaloids was dissolved in 15 mils of 3 per cent. sulphuric acid by the heat of a water-bath, the temperature adjusted to 25°C., 1·5 mil of fuming nitric acid (D. 1·435) containing 1 per cent. N_2O_4 added, and the mixture set aside for fifteen minutes. Excess of sodium hydroxide was next added, and the alkaloid shaken out with chloroform.

Alkaloid taken.			Alkaloid recovered.	
Brucine (1)	0·219		(1)	0·0018
(2)	0·0841		(2)	0·0006
Strychnine (1)	0·3455		(1)	0·3455
(2)	0·0388		(2)	0·0387
Brucine	0·0286	(1)	(1)	0·0168
Strychnine	0·0164			
Brucine	0·0982	(2)	(2)	0·0359
Strychnine	0·0352			

The residues from the brucine experiments were strongly coloured, and gave no characteristic reaction for either alkaloid. It is noteworthy that when either ammonia or sodium carbonate was used to neutralize the acid liquid, the amount of residue obtained from the brucine chloroformic-extract was greater than when sodium hydroxide was employed. Experiments were also conducted on the total alkaloids obtained in the assay of nux vomica and its preparations. The exact details of the assay process founded on the oxidation method already described and followed in these experiments are as follows: The total alkaloids obtained in the usual way from 2 Gms. of the drug, or 5 mils of the liquid extract, or 25 mils of the tincture, are dissolved in 15 mils of 3 per cent. sulphuric acid, the temperature of the solution adjusted to 25°C., 1·5 mil of fuming nitric acid (D. 15·5, 1·435), containing 1 per cent. N_2O_4 added, and the mixture set aside for fifteen minutes, stirring occasionally. The mixture is then transferred to a separator, excess of 10 per cent. solution of sodium hydroxide and 10 mils of chloroform added, and the mixture well agitated. After separation the chloroform is drawn off into another separator. The extraction is repeated with two further quantities of 5 mils of chloroform, the chloroform extracts bulked in the second separator, and washed with 2 per cent. sodium hydroxide solution. The chloroformic extract is next transferred to a tared wide-mouthed flask, and distilled to about 1 mil. Two mils of amylic alcohol are then added and the alkaloidal solution evaporated in a current of warm air. Finally cover the mouth of the flask with a loosely fitting cap of thin filter-paper and dry at 110°C. until constant.

Results were checked by the British Pharmacopœia process, and were found to agree closely. The data are set out expressed in percentages in the following table—

	Strychnine, Modified U.S.P. Method.	B.P. Method.
Drug	1·152	1·145
	0·957	0·944
Extract	8·47	8·45
	6·38	6·38
Tincture	0·258	0·2574

The particular points requiring attention in conducting the assay are—

(1) The oxidation should not be allowed to proceed beyond the time indicated, otherwise loss of strychnine will occur. In one experiment I found that 14·75 per cent. disappeared in five hours, or 2·95 per cent. per hour, and in another 65·5 per cent. in sixty-four hours, or 1·03 per cent. per hour.

(2) The strength of the fuming nitric acid should be adhered to. No difficulty should be experienced in this direction, as the range of the nitrogen peroxide content of commercial fuming acids will admit of this being accomplished. The diluting acid should be N_2O_4 free, and of suitable gravity. The most reliable method for ascertaining the amount of N_2O_4 in fuming nitric acid is the permanganate process. This in the hands of the author has given every satisfaction and is carried out as follows: Charge a 100-mil burette (graduated in one-twentieths) with the acid, allow to cool to temperature of laboratory (which note). Run the acid slowly into a measured quantity of semi-normal permanganate (15·829 Gm. per litre) kept at or near 40°C., until the pink colour just disappears. Each mil of N/2 permanganate corresponds to 0·023 Gm. of N_2O_4. Therefore, if $x =$ mils of permanganate taken, $y =$ mils of acid required to decolourize this, and $s =$ specific gravity, then the N_2O_4 in percentage by weight is equal to $\frac{2{\cdot}300x}{ys}$.

(3) The directions regarding the final drying of the alkaloid should be strictly observed, for if these are disregarded loss of strychnine will occur owing to decrepitation.

The experiments described in this note demonstrate that the U.S.P. assay process modified as proposed is capable of giving accurate results under conditions which, when compared with the technique involved and time absorbed in working the official ferrocyanide method or Gordon and Prescott's periodate process (*Amer. Journ. Pharm.*, 71, 18) are obviously not onerous to the worker.

The experimental work in connexion with this note was carried out in the laboratories of Messrs. Hough, Hoseason, and Company, Pendleton and Manchester.

THE USE OF ALCOHOL IN PHARMACY.

By D. B. Dott, F.R.S.E.

Alcohol is used as a solvent, as a preservative, and in some instances because of its volatility. Without going back to ancient history, there has been manifest a distinct tendency to reduce the proportion of spirituous preparations. Comparing the 1885 with the 1898 Pharmacopœia, we find the tinctures reduced from 72 to 65, and the liquid extracts increased from 12 to 17. Not only so, but while proof spirit is the weakest strength of alcohol used in the former Pharmacopœia, the 1898 edition has several tinctures prepared with 45 per cent. alcohol. The question arises: Can the proportion of alcohol used in pharmaceutical preparations not be still further reduced without diminishing the medicinal value of the preparations? I venture to think that it may. Tinctures of orange, lavender (compound), lemon, and podophyllum might be altered from 90 per cent. to 70 per cent. alcohol. Tinctures of cascarilla, cinchona, cinnamon, conium, and pyrethrum from 70 to 60 per cent. alcohol. Tinctures of calumba, chiretta, saffron, digitalis, ergot, rhatany, hops, quillaia, squill, and senega from 60 per cent. to 45 per cent. Tinctures of aloes, cochineal, hyoscyamus, opium, quassia, and stramonium might be prepared with 30 per cent. alcohol instead of 45 per cent. Among the liquid extracts, belladonna should be reduced to 70 per cent. alcohol (if the root were retained); cimicifuga and ipecacuanha also to 70 per cent. Coca might be reduced to 45 or even 30 per cent., and would be more miscible. Nux vomica is extracted sufficiently well with 60 per cent. alcohol, which has the advantage of leaving the oil for the most part behind. According to the Pharmacopœia there are eleven solid or semi-solid extracts which are prepared by extracting with alcohol of various strengths and distilling or evaporating. In general this must be regarded as wasteful. It is obvious that any solvent which dissolves out the active principles of the drugs, and which may be removed without too much heat, is suitable for the preparation of extracts. Having obtained the concentrated extract, it is then only necessary to add the required amount of diluent to standardize. There is a growing tendency to make the extracts in powdery form, as being more convenient for dispensing, and securing greater uniformity of composition. Sugar of milk is not a good desiccating material, unless present in large proportion. Phosphate of lime is a favourite desiccant, but probably an inert soluble salt could be used in many cases with advantage.

Glycerin is employed in a few instances, partly as a solvent and partly as preservative. In concentrated extracts where the dose is small, as in fluid cascara, glycerin might more frequently replace the alcohol. For instance, liquid extract of ipecacuanha might be made up with glycerin instead of alcohol. The question of how far diluted acetic acid can replace alcohol as a solvent requires further investigation, but we have some very good testimony in its favour. It was strongly advocated by Dr. E. H. Squibb (*Year-Book*, **1898**, 207) for the preparation of liquid extracts, because the products keep well, and are miscible with water. Cowley and Catford (*ibid.*) found that acetic acid was nearly equal to proof spirit as a menstruum for extracting colchicum corms and seeds. W. B. Thompson (*Year-Book*, **1899**) admits that acetic acid gives good results with cascara sagrada and ergot, but prefers the alcoholic extract in most cases, particularly in that of aconite. Dr. E. R. Squibb (*Year-Book*, **1900**, p. 192) recommends acetic acid in making liquid extracts of belladonna root and of cinchona bark. The latter does not extract so readily with acetic acid as with alcohol and glycerin, but it gives a more permanent extract, and especially one which is generally miscible without precipitation, which is by no means the case with the alcoholic preparation. Ten per cent. was the strength of acid used by Dr. Squibb, but no doubt 8 per cent. or even 6 per cent. would suffice in some cases. Certainly in those cases where the active principles are extracted and retained unimpaired by diluted acetic acid, it would be a great saving of alcohol to prepare extracts with the acetic menstruum.

In the preparation of liniments the use of methylated spirit might be authorized and extended. Acetone should be introduced as a solvent for other things besides pyroxylin. It dissolves many active principles, such as cantharidin, and has the advantage over alcohol of being a solvent of fixed oils and fats.

Mr. Alcock referred to an experience of his in which alcohol had been an important ingredient in a widely-known and appreciated remedy, and he was told that it was suggested that on the "blue-ribbon" ground it would be advisable to lower the quantity of the alcohol in the preparation, and it was done, but to the detriment of the medicinal efficacy of the preparation. As it appeared to be sliding off the commercial platform, the proprietor came forward with the suggestion that it must be made *ut antea*, and the sale and efficacy recovered itself and it is still an important weapon in curative medicine.

Mr. H. Finnemore said he should like to mention some experience he had with reference to acetone as a solvent. He had used it as a solvent in hair lotions, but it had the general disadvantage of being more inflammable than alcohol and in particular it reacted more easily with other substances. In one lotion containing ammonia, a deep yellow coloration occurred which dyed the skin, and in another solution containing iodine a most pungent odour was developed, which was probably iodo-acetone, which substance might be the cause of the pungent smell developed when iodine was dissolved in methylated spirit. Therefore, it seemed most desirable before the adoption of acetone as a solvent that many experiments should be undertaken to discover its limitations.

P-HYDROXYPHENYLETHYLAMINE, AN ACTIVE PRINCIPLE OF ERGOT, SOLUBLE IN WATER.

By G. Barger, M.A., D.Sc.,

From the Wellcome Physiological Research Laboratories, Herne Hill, S.E.

The following is a summary (written at the request of one of the Honorary General Secretaries of the British Pharmaceutical

Conference) of recent work on a new active principle of ergot. It was pointed out by Barger and Dale (*Biochem. Journ.*, 1907, **2**, 286) that the alkaloid ergotoxine (Barger and Carr, *Trans. Chem. Soc.*, 1907, **91**, 337), while being responsible for many of the characteristic effects of ergot, is only present in very small quantities in most specimens of the pharmacopœial preparations ; such of these specimens as possess any appreciable activity were therefore regarded as containing a second active principle. Attempts to isolate this substance were for a long time unsuccessful. Vahlen (*Archiv. Exper. Path. Pharm.*, 1906, **55**, 131) seems also to have been aware of the existence of such a water-soluble principle, but his so-called " clavin " has been shown to be an inert mixture of amino-acids (Barger and Dale, *Biochem. Journ.*, 1907, **2**, 288).

The physiological properties of p-hydroxyphenylethylamine, recently isolated from putrid meat by Barger and Walpole (*Journ. Phys.*, 1909, **38**, 343), suggested that this base might be the above-mentioned active principle of aqueous ergot extracts. It has, indeed, been possible to prove that p-hydroxyphenylethylamine occurs in such extract, and that the presence of this base accounts in a satisfactory manner for such of the activity as is not due to small quantities of ergotoxine (see Barger and Dale, *Proc. Physiol. Soc.*, May 15, 1909). The method of isolation has recently been described in detail elsewhere (Barger, *Trans. Chem. Soc.*, 1909, **95**, 1123), and was based on the fact that the active principle is both an amine and a phenol, and that it is moderately soluble in amyl alcohol, but only very slightly so in ether. A small quantity of crystalline dibenzoyl-p-hydroxyphenylethylamine was thus obtained from ergot, and was identified by the constancy of its melting point after mixing with an equal quantity of the synthetic substance, and by its physiological activity after hydrolysis, and the fact that it then gave Millon's reaction.

In the last-mentioned paper (Barger, *loc. cit.*) a convenient synthesis of p-hydroxyphenytlethylamine is described by the reduction of p-hydroxybenzylcyanide—

$$OH{\cdot}C_6H_4{\cdot}CH_2{\cdot}CN + 4H = OH{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}NH_2.$$

Previously this amine had been obtained by various authors in small quantities only, by heating tyrosine and by putrefaction—

$$OH{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH = OH{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}NH_2 + CO_2.$$

The base forms hexagonal leaflets, m.p. 161°, b.p. 161-163° at

2 Mm.; it is readily soluble in water, and furnishes crystalline salts; the free base gives Millon's reaction. The physiological properties of p-hydroxyphenylethylamine have been described in detail by Drs. H. H. Dale and W. E. Dixon (*J. Physiol.*, 1909, **39,** 25), its action on the uterus and blood-pressure is similar to that of adrenaline, $(OH)_2{\cdot}C_6H_3{\cdot}CH(OH){\cdot}CH_2{\cdot}NH{\cdot}CH_3$, to which the substance from ergot is also related chemically. Weight for weight, p-hydroxyphenylethylamine is less active than adrenaline, but the effect is more prolonged; the substance is also much less toxic than adrenaline. The amount of p-hydroxyphenylethylamine present in ergot cannot be estimated by chemical means, but on physiological grounds it would appear to be of the order of 0·1–0·01 per cent.

The discovery of the physiological action of p-hydroxyphenylethylamine has afforded an explanation of the observations by Dixon and Taylor (*Brit. Med. Journ.*, **1907,** ii, p. 1150), relating to the effects of placental extracts on the blood-pressure and uterus. After Barger and Walpole (*loc. cit.*) had shown p-hydroxyphenylethylamine to be the chief pressor substance in extracts of putrid meat, Rosenheim (*Journ. Physiol.*, 1909, **38,** 337) was able to demonstrate its presence in active extracts of placenta; since he had previously shown that extracts of perfectly fresh placentae are inactive, it follows that Dixon and Taylor's preparations did not owe their activity to any specific placental principle, but to p-hydroxyphenylethylamine resulting from incipient putrefaction.

The question whether p-hydroxyphenylethylamine occurs as such in ergot, or is only formed by bacterial action in the process of extraction, is at present undecided; it is most probable, however, that the base is a result of the normal metabolism of the living fungus, like cadaverine and putrescine, two "putrefactive" bases isolated from ergot by Rieländer.—*Sitzber. Gesell. Naturw. Marburg*, **1908,** No. 27.

ON MALT EXTRACT WITH COD-LIVER OIL.

By E. F. Harrison, B.Sc. (Lond.), F.I.C.,

Pharmaceutical Chemist.

I have lately had occasion to analyse a good many different specimens of malt extract with cod-liver oil as at present offered to the public, and the results appear to be of sufficient interest to be put briefly before the Conference.

The specimens examined comprised nine different ones sold under particular brands, these including all those that I am acquainted with as having any considerable sale, four supplied by large retail drug-store companies or general stores in London as their own, and six prepared by different manufacturing houses and supplied ready packed for retail to the pharmacist, the labels bearing no name or that of the retailer.

The quantity of oil was determined by mixing a known weight of the preparation with water, adding excess of hydrochloric acid to break the emulsion, and shaking with successive quantities of petroleum ether until no more oil was removed. The number of treatments with petroleum ether varied much in different cases. The solution of oil was distilled to a small bulk, transferred to a tared dish, and the evaporation completed and the oil dried in the water-oven. By working on mixtures containing known amounts of oil, I found that the results obtained in this way were quite satisfactory. I also tried diluting the original mixture with water and adding the dilution to freshly-ignited sand, drying thoroughly in the water-oven and extracting the dry sand mixture in a Soxhlet apparatus with ether. This proved to be at least as slow and as much trouble as the other method, and did not give quite such good results. The figures below were all obtained by the former method.

Having ascertained the percentages of oil, a known weight of each preparation was mixed with a known quantity of water, and the oil removed by shaking with petroleum ether in large quantity. No acid was added in this case, and a much longer time was necessary for separation of the liquids. In this way I obtained an aqueous solution, of known strength, of the extract contained in each preparation, and I used this for determining the maltose and the diastatic power. The former was found by titration with Fehling's solution, and the whole of the reducing sugar found was calculated as maltose. The diastatic strength was found by the method I have previously described (*Pharm. Journ.*, March 20, 1909). Very different strengths were found, and the proportion of starch to extract was varied so as to give figures as fairly comparable as possible.

The quantity of oil is here given as percentage *by weight* in the original mixture; the maltose and diastase are calculated on the extract.

Sample.	Percentage of Oil.	Diastatic Value of the Extract.	Maltose per cent. in the Extract.
No.			
1	33·8	680	59·4
2	15·5	776	60·0
3	17·4	5	53·6
4	3·6	87	60·0
5	22·3	413	55·9
6	4·7	335	75·2
7	14·7	29	62·4
8	30·5	129	54·4
9	3·8	172	67·7
10	6·2	31	55·9
11	2·1	104	69·1
12	5·7	10	65·4
13	10·1	17	57·9
14	6·8	43	59·2
15	5·7	150	71·2
16	7·5	50	63·7
17	10·3	15	60·0
18	8·6	21	72·9
19	1·5	9	60·5

Nos. 1 to 9 were the proprietary brands, Nos. 10 to 13 the preparations from the stores, and Nos. 14 to 19 the "own name specialities." I think it will be agreed that the very great differences shown indicate a state of things which is unsatisfactory, at least from the point of view of the public.

I desire to acknowledge the services of my assistant, Mr. P. A. Self, B.Sc., A.I.C., in the work here recorded.

THE COMPARATIVE EXAMINATION OF THE HALOGEN ABSORPTION OF OILS BY THE METHODS OF HÜBL, WIJS, HANUS, AND McILHENEY.

By John Stewart Remington and Harold Lancaster.

In the Research List for 1908 it was stated that a comparative examination of the value of various methods which have been adopted for fixing the halogen absorption of oils and fats was desirable, and a large part of the analytical work undertaken at the Aynsome Laboratories being in connexion with the examination of oils, this work was extended in order to carry out the investigation recommended.

The oldest method of determining the iodine value of oils is that devised by Hübl. This method, however, has several defects affecting its accuracy. First, the combined solutions of iodine and mercury chloride rapidly lose strength, especially after the first few hours of mixing, on which account it is well to allow the mixed solutions to stand for twelve hours in the dark before use. It is not, however, desirable to use a mixed iodine solution which has remained standing for a longer period than twenty-four hours, and any solution more than a week old is quite unfit for further use.

Wijs, and other investigators, have demonstrated the far-reaching effects of this error, and the following table of results—obtained by Tolman—illustrates the differences occurring when the blank is titrated at the beginning and the end of the times given—

Time of Absorption (Hours).	Blank titrated at Beginning.	Blank titrated at End.
2	173·74	—
7	177·65	170·39
24	181·89	165·16

A decrease in the iodine number after seven hours, if the blank is titrated at the end of the determination, is shown. The change in strength can, however, be greatly lessened by using purified absolute alcohol, but even under these conditions the solution quickly becomes so weak as to be of no further service.

A further defect in the Hübl method is the slowness of the reaction and the length of time that the oil under examination is required to stand before the maximum figure is obtained; and a third objection to be raised is that the length of time that the oil and halogen solutions shall remain in contact is determined at the option of various analysts, so that it is possible for different results on the same oil to be obtained. For example, Allen recommended that the length of time should be two hours; Wijs recommended seven hours; Lewkowitsch, twelve to eighteen hours; Stillman, six to eight hours; Archbutt and Deeley, six to twelve hours; Hopkins, four hours; Simmons and Appleton, eighteen to twenty-four hours. In order to ascertain which period of time recommended gave the most satisfactory results, further work was undertaken, and it was thought desirable to endeavour at the same time to provide answers to the following questions, which seemed to have an important bearing on the various processes under consideration—

(*a*) How do results obtained by Wijs and Hanus compare with those given by Hübl ?
(*b*) What length of time is required to obtain a maximum figure ?
(*c*) How does light affect the reaction between the oil and halogen ?
(*d*) Does the age of the solution affect results ?

In connexion with the first query presented, the values of samples of pure (East Indian) linseed oil, lard oil, and rape oil were determined in accordance with the directions given by the authors of the standard methods, and the results are herewith shown—

	PURE LINSEED OIL.	PURE LARD OIL.	PURE RAPE OIL.
Hübl .	172·92	67·82	87·99
Wijs. .	172·71	66·69	87·92
Hanus .	168·99	65·40	86·53

It will be seen from the above figures that in the case of all three oils under examination the Hübl and Wijs methods compared favourably one with another, but that somewhat lower results were obtained in every instance by the Hanus method. Hanus advises an excess of at least 60 per cent. halogen in order to obtain complete absorption, but it was found that 70 per cent. was not too great an amount to secure satisfactory results in dealing with drying oils, such as linseed.

As regards the length of time required to obtain a maximum figure, in the case of linseed oil this was obtained in twenty-four hours by Hübl's method, with the Wijs solution in two hours, by the Hanus method in forty-five minutes. In order, however, to obtain results by the Wijs and Hanus methods which would favourably compare with those obtained by the slower method of Hübl, it was found necessary to have at least 80 per cent. excess in the case of Wijs and 70 per cent. in the case of Hanus. The following figures illustrate clearly the rates of absorption by the Wijs and Hanus methods, using varying amounts of halogen, the sample being one of pure (East Indian) linseed oil—

WIJS (Two Hours).

Excess Halogen.	Iodine Value.
80 per cent . .	172·71
70 per cent. . .	166·99
60 per cent. . .	112·45
50 per cent. . .	90·40
40 per cent. . .	53·59
30 per cent. . .	33·83
20 per cent. . .	20·48

HANUS (Forty-five Minutes).

Excess Halogen.	Iodine Value.
80 per cent. . .	168·99
70 per cent. . .	168·96
60 per cent. . .	149·42
50 per cent. . .	130·39
40 per cent. . .	118·98
30 per cent. . .	70·92
20 per cent. . .	53·13

Effect of Light on the Reaction between the Oil and Halogen.—It was found that the Hanus method was less affected by light than the Wijs, but in all cases less concordant results were obtained in the light than in the dark.

Age of the Solutions as affecting Results.—It was found in the case of the mixed Hübl solution that a fresh solution (not more than twenty-four hours old) gave the best and most accurate results. Further, that with keeping the solution rapidly lost strength, thus making the method an unreliable one. One of the advantages to be claimed for the Wijs method, apart from the rapidity with which it is possible to carry out the test, is that the titre remains unchanged for a considerable time. Lewkowitsch states it will keep in good condition for five months, hence for rapid work it is not necessary to make a blank test in every instance.

For drying oils, such as poppy seed, China wood, and linseed oils, having an absorption ranging from 136 to 180, one hour to two hours was found sufficient in order to obtain a maximum absorption. In the case of semi-drying oils, such as cotton seed oils, half an hour to one hour, and for non-drying oils, such as olive oil, not more than half an hour. In using the method of Hanus it was noticed that the action of light had very little, if any, effect on the solutions, but it was found necessary to exercise great care to prevent the temperature of the solution from changing during the operation, as this made an appreciable difference in its strength, the acetic acid employed having a high co-efficient of expansion. The following table will afford some idea of the comparative value of these methods—

	Hübl.	Wijs.	Hanus.
Linseed	173–178	177–179	170–176
China wood	159–161	158–161	158–160
Hemp-seed	148–157·5	148–158	157–161
Poppy-seed	135–137	136–138	134–136
Cotton-seed	105–108	104–109	102–109
Maize.	111–127	122–126	111–122

Another process which has of late come into favour among analysts is the bromine absorption method of McIlheney. This is fully described by the author in a paper appearing in the *Journal* of the American Chemical Society for 1899. The utilization of bromine had been previously advocated by Allen in the analysis of shale oils. McIlheney's method consists, briefly, in adding to a weighed portion of oil or fat in a stoppered bottle an excess of standard solution of bromine in carbon tetrachloride, determining the excess of bromine, after the action between the oil and reagent has taken place, by the addition of an aqueous solution of potassium iodide, and titrating with sodium thiosulphate. Any hydrobromic acid which may have been formed in the reaction is thus determined in the aqueous solution. The percentage of bromine found as hydrobromic acid is called the "bromine substitution figure," and the total percentage of bromine absorbed, less twice the bromine substitution figure, gives the "bromine addition figure." It has been proved by several investigators that if the fat or oil is treated with twice the quantity of bromine with which it can combine, the reaction is almost instantaneous, no higher addition figure being obtained on allowing the halogen and oil to remain in contact for five minutes than for one minute. The superiority of bromine over iodine for the purpose under consideration has been further demonstrated, and was spoken of highly as early as 1895 by Hehner and Mitchell, who devised a process by which the heat generated by the action between the bromine and oil was measured. The Hehner and Mitchell process, however, is inferior to McIlheney's in that it fails to distinguish between "addition" and "substitution," and further, the errors of the thermometer reading are multiplied by five and a half in calculating the Hübl figure. The accompanying table shows the results obtained by us on samples of pure linseed, lard, and rape oil. It will be seen that the amount of bromine absorbed on one, two, and five minutes is practically the same.

As a result of this work, the following conclusions are offered—

1. That much better results are obtained by the Wijs than by the Hanus or Hübl methods.

2. That the Wijs solution gives results which agree closely with existing data, but that 70 to 80 per cent. halogen is required to obtain quick action and maximum results.

3. That to obtain a maximum absorption by the Wijs method

for drying oils (such as linseed) two hours must be allowed; for semi-drying oils, one hour; and for non-drying oils, half an hour.

4. That the mixed Hübl solution deteriorates rapidly after twenty-four hours, and is not reliable on account of the decrease in strength. It also requires a blank to be done with each determination, whereas the Wijs and also the Hanus solutions will keep in a normal condition for several months.

5. That in the case of both Wijs and Hanus methods more concordant results are obtained in the dark than in the light.

6. That none of the iodine methods are so rapid as the bromine process of McIlheney, which is practically instantaneous.

7. That the Hübl method is not only long and tedious, thus delaying the analysis, but fails to make a distinction between the iodine absorbed by addition and the iodine absorbed by substitution.

8. The standard solution of bromine will not change or deteriorate on keeping, and is easily prepared.

9. By the bromine process the absorption of the halogen by addition is determined separately from the absorption by substitution, whereby additional information is gained as to the nature of the oil, fat, or resin under examination.

10. As above stated, the Wijs method is superior to that of ether Hübl or Hanus, but McIlheney's method is both rapid and inexpensive, and this, combined with stability of the standard bromine solution, renders it preferable to any of the iodine methods.

A.—LARD OIL.

	Lard Oil (One min. Absorption).	Lard Oil (Two mins. Absorption).	Lard Oil (Five mins. Absorption).
Hübl's iodine figure	67·62	67·62	67·62
Bromine, calculated from Hübl . .	41·80	41·80	41·80
Bromine substitution figure, twenty minutes standing	0·48	0·55	0·56
Bromine substitution figure, thirty minutes standing	—	—	—
Bromine addition figure	40·42	40·76	41·15
Bromine from Hübl, divided by bromine addition figure. . . .	1·030	1·025	1·034
Percentage of bromine absorbed . .	41·38	41·87	42·27

B.—PURE (EAST INDIAN) LINSEED OIL.

	Linseed Oil (One min. Absorption).	Linseed Oil (Two mins. Absorption).	Linseed Oil (Five mins. Absorption).
Hübl's iodine figure	172·92	172·92	172·92
Bromine calculated from Hübl . .	108·92	108·92	108·92
Bromine substitution figure, twenty minutes standing	1·94	1·61	1·64
Bromine substitution figure, thirty minutes standing	—	—	—
Bromine addition figure	92·10	92·31	91·55
Bromine from Hübl, divided by bromine addition figure. . . .	1·102	1·179	1·189
Percentage of bromine absorbed . .	95·06	95·53	95·83

C.—RAPE OIL (REFINED).

	Rape Oil (One min. Absorption).	Rape Oil (Two mins. Absorption).	Rape Oil (Five mins. Absorption).
Hübl's iodine figure	86·53	86·53	86·53
Bromine calculated from Hübl . .	54·5	54 ·5	54·5
Bromine substitution figure, twenty minutes standing	1·46	—	1·43
Bromine substitution figure, thirty minutes standing	—	3·68	—
Bromine addition figure	49·68	47·32	51·34
Bromine from Hübl divided by bromine addition figure	1·134	1·144	1·061
Percentage of bromine absorbed . .	52·68	54·30	54·25

Mr. E. W. POLLARD thought it desirable that some agreement should be come to by analysts regarding the best iodine absorption method; the disadvantage of Wijs's method was that the acetic acid was so volatile, otherwise it was most convenient.

Mr. COWIE said that he could corroborate the statements made by Mr. Stewart Remington regarding the use of Hübl's process as being tedious by the conditions under which it must be carried out, yet it may be found necessary to use it in certain cases where the acetic acid would interfere with the reaction. Wijs's method is certainly a great improvement, in that it keeps well and saves time, and its only disadvantage is its acidity.

NOTE ON THE DETERMINATION OF GINGEROL IN GINGER.

By H. Garnett and J. Grier.

The authors have made a number of experiments with the object of devising a convenient and accurate method of determining the percentage of gingerol, the phenolic substance to which alone the pungency of ginger is due.

In the earlier series of experiments the powdered ginger was first moistened and mixed with various alkaline substances and dried, with the object of fixing the inert resinous constituents, some of which are of an acid nature. The substances used were sodium carbonate, ammonia, lime, and magnesia; the caustic alkalies were avoided, as we had shown in our previous communication (*Year-Book of Pharmacy*, 1907), that gingerol was completely destroyed by digestion with these. The later experiments were carried out without the addition of these substances, as their use was found to present no advantage; further, in a blank experiment with magnesia, using a known weight of pure gingerol, an appreciable loss, accompanied by resinification, was found to occur.

Methods of Extraction.

In each case 10 grammes of the finely-powdered drug were taken and dried for fifteen minutes in the water-bath. The following solvents were employed—

(1) *Light Petroleum*, b.p. 70 to 90°C. Gingerol is but sparingly soluble in cold petroleum, but dissolves much more freely when hot; extraction was therefore done with the hot solvent in a Soxhlet apparatus. It was found, however, that after two hours' boiling, when no more gingerol was being dissolved out, the marc still retained a distinct pungency; a similar result was noticed in the case of percolation with cold acetone, pointing to the fact that a portion of the gingerol exists in a different state of combination.

(2) *Pure Ether* (free from alcohol and water) was then employed, using fresh portions of the powdered drug. Complete exhaustion was obtained, but the gingerol was accompanied by more of the inert fatty and resinous constituents, making the process of purification more tedious.

(3) Cold percolation with *Alcohol* of 50 and 60 per cent. strengths was also employed, gingerol being freely soluble in alcohol of these strengths. Here also much inert extractive, but of a gummy

and sugary nature, accompanied the gingerol, rendering its subsequent separation difficult.

(4) *Pure Acetone* (by cold percolation). Although the extraction of gingerol is at first rapid, continuous percolation fails to completely exhaust the powder, as in the case of petroleum spirit.

(5) *Pure Alcohol* extracts completely, but, like ether, dissolves very large quantities of inert fatty and resinous matter.

PURIFICATION OF THE EXTRACTIVE.

Where petroleum spirit was used as the solvent, the percolate was at once shaken with three successive portions of 60 per cent. alcohol, which dissolves out the gingerol readily, leaving in the petroleum spirit the volatile and fatty oils and much colouring matter. The alcoholic solution was then washed with a further portion of petroleum spirit to free it from traces of fat, etc., the alcohol evaporated off or recovered, and the residual liquid shaken out with three successive lots of ether; the ether evaporated off, and the residual gingerol weighed, after drying on a water-bath till constant. The purity of the gingerol was determined by its ready solubility in cold 1 per cent. aqueous potash solution. When ether or acetone was used for extraction the solvent was recovered, and the residue boiled with successive portions of petroleum spirit, the solution filtered, and then treated as above with 60 per cent. alcohol. In the final shaking out, carbon bisulphide or chloroform may be used instead of ether; a drop of dilute HCl at this state greatly assists separation of the two liquids.

Further experiments are in progress, but our results lead us to think that the extraction with ether is more satisfactory than with petroleum ether, acetone, or weak alcohol.

The following are some of the results obtained—

	Solvent.	With MgO.	With $Ca(OH)_2$.	No addition.
Jamaica ginger—	Pure ether .	1·1 per cent.	1·13 per cent.	—
	Petroleum spirit	1·04 ,,	—	—
African ginger :—	Pure ether .	2·0 ,,	—	—
	Petroleum spirit	—	—	1·95 per cent.

If the presence of capsicum in the powder is suspected, it should first be tested for by the method devised by us, and described in the paper read before the Conference (see *Year-Book of Pharmacy*, 1907).

Further experiments are in hand with gingers from various sources, and also with a view to determining the gingerol content of various tinctures, essences, and the "gingerines" of commerce.

GENERAL BUSINESS.

VOTE OF THANKS TO THE AUTHORITIES OF ARMSTRONG COLLEGE.

After luncheon on Tuesday, which was served in the King's Hall of the College, the loyal toasts having been duly honoured.

The PRESIDENT said there was one duty which they ought not to omit to perform before they dispersed, and that was to remember, and fittingly to say they remembered, they were in the King's Hall of Armstrong College, and that Armstrong College had been thrown open for their use during the sessions of the Conference. They all recognized their indebtedness to the College, and the least they could do was to accord their very cordial thanks to the authorities for their kindness. He wished to associate the toast with the name of the Vice-Principal, Professor Lebour, whose interest in their proceedings had been most marked.

Professor LEBOUR said he could assure them that the Armstrong College was extremely pleased to have an opportunity of showing its sympathy for all those branches of knowledge in which pharmacists were interested, and the foundations of which could be learned in the College. Their first Professor of Chemistry, Professor Mareco, said that a University was a place in which anything that was wanted would be and could be taught. He (the speaker) knew that was a counsel of perfection, but still that was the aim of every university, and if pharmacists said they wanted pharmacy taught in the university manner, the College would be compelled to teach it. (Applause.)

PRESENTATION OF BOOKS.

Mr. W. A. H. NAYLOR, on behalf of the Conference, presented the following books from the Bell and Hills Fund to the local Association: *United States Dispensatory*, by Dr. G. B. Wood and Dr. Franklin Bache; *Chemical Technology and Analysis of Oils, Fats, and Waxes*, 3 volumes, by Dr. Lewkowitsch; *Anatomical Atlas of Vegetable Powders*, by Professor

H. G. Greenish; *The Microscope and Its Revelations*, by (Carpenter) Dallinger; *Forensic Medicine and Toxicology*, by J. D. Mann; *Foods, Composition and Analysis*, by Alex. W. Blyth and M. W. Blyth; *Text-Book of Materia Medica*, by H. G. Greenish.

Mr. T. Maltby Clague, in acknowledging the gift, said he could assure Mr. Naylor that the books they received twenty years ago were in a very good state of preservation, and he was pleased to be able to inform them that the handsome and useful volumes were going to be placed in the Library of the Armstrong College, and an arrangement had been made whereby every Member of the Conference resident in the district, and every member of the local Chemists' Association, would have free and full access at all reasonable times to those books.

The Retirement of Mr. White.

Sir Edward Evans proposed the toast of the retiring Secretary, and said Mr. White had been one of the Secretaries of the Conference for six years and they were all sorry he was resigning that position. His peculiar department had probably been of more service than almost any other connected with the Pharmaceutical Conference, because it was the scientific part of it. He had had a great deal to do with the *Year-Book*, and, as they had heard from the President, it was the duty of every one connected with the trade to join the Pharmaceutical Conference in order that they might possess a copy of the *Year-Book.* All those who had attended the Conferences had heard Mr. White read abstracts of papers which had been sent in, and in that he was an absolute adept, and had given interest to those papers which possibly they would not have had if they had been in the hands of those who had produced them. Although they had to part with Mr. White, he would still attend the Conferences as regularly as he had done in the past, and therefore they would not lose his services. (Applause.)

Mr. White, in responding, said he could assure the members it had been a very great pleasure to him to do what he could for the Conference. He had spent six happy years as joint Secretary, and he could only hope that his successor would have as agreeable an experience as he had had. His work had been done more or less underground. Everybody saw the ornamental secretary who did all the work, but he (the speaker) had to go quietly away and work on his holidays, and no doubt his successor would do the same. The duties were certainly very pleasant. He thanked them all in the name of his wife and himself for the many kindnesses they had received.

NEXT YEAR'S MEETING-PLACE.

After luncheon on Wednesday the PRESIDENT called on Mr. E. S. PECK, who extended a cordial invitation to the Conference to meet at Cambridge in 1910, and said it had taken forty-six years for the Conference to get to Cambridge. It was now over forty years since the Conference visited East Anglia, and he thought the time had now arrived when it should meet at Cambridge, and in doing so they would complete the cycle of the old university towns, for they had already visited Aberdeen, Durham, Edinburgh, St. Andrews, and Oxford. He felt sure it would be unnecessary for him to dilate on the glories of the town and University of Cambridge. He was quite sure that the whole Local Executive would work heartily to provide them with a quiet, interesting and, he hoped, refreshing Conference. (Applause.)

Mr. F. RANSOM said that unfortunately he came from a small town which would never have the opportunity of inviting the Conference ; it therefore gave him much pleasure to join in inviting them to Cambridge, which was not very many miles from his own town. Personally he had no pleasanter recollection than the meeting of the Conference which was held at Oxford, and he believed that it was one of the most successful Conferences that had ever been held. He thought that in the town of the sister university the meeting would be equally successful.

Mr. WELLS moved and Mr. J. R. HILL seconded that the invitation to Cambridge be accepted.

ELECTION OF OFFICERS.

Dr. SYMES proposed, Mr. John Harrison seconded and the proposal was unanimously adopted that Mr. F. Ransom be elected President.

Mr. F. RANSOM briefly thanked the Conference for the honour conferred on him.

On the motion of Mr. PETER BOA, seconded by Mr. GILES, the following officers were also elected for the ensuing year—

Vice-Presidents :—Messrs. J. F. Harrington, J. P. Gilmour, J. R. Green, John Smith, H. G. Greenish, and Edmund White.

Hon. Treasurer :—J. C. Umney. Hon. General Secretaries :—Messrs. E. S. Peck and H. Finnemore. Executive Committee :—Messrs. F. H. Alcock, F. W. Branson, E. F. Harrison, D. L. Howard, H. W. Gadd, E. H. Church, J. S. Hills, T. M. Clague and A. S. Campkin.

Thanks to the President.

Mr. Naylor, in an eloquent speech, moved a vote of thanks to the President for the excellent manner in which he had conducted the business.

Mr. Tocher briefly replied.

Thanks to the Local Committee.

Mr. Tyrer proposed a vote of thanks to the Local Committee and the Chairman (Mr. Weddell). Mr. Paterson (Aberdeen) seconded.

In an amusing speech Mr. Weddell replied eloquently, and thanked the visitors for the geniality, sociability, and cheerfulness they had displayed during the visit to Newcastle. He paid an eloquent tribute to the work done by Mr. Clague, who, he said, should have been Chairman.

THE SOCIAL GATHERINGS.

The Reception.

On Monday evening, July 26, the President, Mr. J. F. Tocher, B.Sc., F.I.C., held a reception at Armstrong College. The formal proceedings took place in the handsome King's Hall, where the guests assembled to the number of about 230, and were received by Mr. and Mrs. Tocher.

The Lord Mayor of Newcastle, who was accompanied by the Lady Mayoress, was present to welcome the Conference to the city, and Professor Lebour, the Vice-Principal, offered a welcome on behalf of the College authorities. Besides the Vice-Principal, there were present as representing the College, Professor Stroud, Professor Potter, Professor Thornton, Professor Meek, and the Secretary, Mr. F. H. Pruen.

The Lord Mayor of Newcastle, in offering a hearty welcome to the members to Newcastle, said he trusted they would have a profitable and happy time. The Conference had its origin in Newcastle in 1863, when Mr. Isaac Lowthian Bell was in the chair. In 1889 the Conference again visited Newcastle. The work the Conference had done during the past forty-six years was a good work, and no words of his were necessary to encourage them to further effort. They had put in the forefront of their desires the purity of drugs. In time of health most people despised drugs, but when illness overtook them they flew to drugs and expected them to restore health and strength. If they had pure drugs, therefore, there was a better chance for them than if they had the adulterated articles. He recognized the high ideal they had set before them. Their deliberations were of great consequence to the country generally, and he trusted they would be carried successfully to the ends they had in view.

Professor Lebour expressed the pleasure it afforded him, in the absence of the Principal, Sir Isambard Owen, to have the duty of welcoming the Conference to the College thrust upon him. It was a pleasure to receive a body like that, because it was just such a body as the College should receive in its best possible manner. Whom could they receive better than a body of men whose entire work and professional life depended upon the truths of science, which were inculcated in buildings like that ? All their work and success in life depended upon these great truths of science which they did their best to teach in such buildings. They in the College did not go into the final details, probably, but they did try and lay the foundation stone. He hoped they would find that although the Principal was absent, Mr. Pruen, the Secretary, had done all he could to make their visit to the College a pleasant one.

The PRESIDENT, responding, said how pleased they were at the cordial welcome which had been extended to them. The origination of the Conference in Newcastle was a fact of which Newcastle might always be proud. He thanked the Lord Mayor of the city and the Vice-Principal of the College for the graceful and cordial terms in which they had expressed themselves.

DEMONSTRATIONS.

During the evening there were exhibitions and demonstrations in several of the departments of the College, including the following : In the physical department, under the direction of Prof. Stroud—the College wireless telegraphic station. Lecture theatre—the Armstrong-Wimshurst machine with electric discharges ; induction-coil experiments with Geissler and Crookes tubes ; Tesla coil experiments ; action of radium-rays on spark-gap ; Fleming's cymometer ; simple optical experiments. In Armstrong laboratory—X-ray experiments. In Herschel laboratory—simple optical experiments. In the Herschel laboratory there was also shown an exhibit of quartz ware by the Thermal syndicate. In the engineering department, under Prof. Thornton —the Royal series of electrical experiments, the singing arc, melting iron under water, the jumping coil, the floating iron bar. In the lower room Mr. C. W. James, M.I.Mech.E., showed metal welding by oxyacetylene and metal cutting by the same process. Mr. W. S. Corder showed wax-paper negatives, daguerreotypes, and apparatus ; and Mr. L. Newbigin showed ornamental turnings and stereoscopic flower studies.

Mr. Godfrey Corbett's band played selections of music during the evening.

GARDEN PARTY.

On Tuesday afternoon the members of the Conference were the guests of Mr. and Mrs. George Weddell at The North Cottage, St. George's. The party proceeded from Armstrong College through Jesmond Dene, and it was almost impossible to realize that the beautiful country passed on the way was only within a few miles of a great centre of industry. The residential portion consists of a series of villas, one of which, surrounded by extensive grounds, is The North Cottage, built in antique style, but with every modern arrangement for comfort. Music was provided on the lawn by R. Smith's Royal Orchestra, and the Newcastle Quartette rendered a programme of part songs and glees. Refreshments were served in a large marquee which was erected in case the weather were unfavourable, which, fortunately, it was not.

CONCERT AND DANCE.

On Tuesday evening there was a reception at the Grand Assembly Rooms, when the visitors were received by Mr. and Mrs. George Weddell. After the reception a most enjoyable musical programme was rendered, the artistes including Miss Lilian Buckley, soprano; Mr. Maurice Pearce, tenor; Miss Beatrice Buckley, contralto; Mr. Ernest Potts, bass; and Mr. A. G. H. Tebb, accompanist. Dancing followed the concert, and the party broke up about midnight, after a most successful evening.

WEDNESDAY'S EXCURSION.

After luncheon on Wednesday the party proceeded to Quayside Ferry Landing, and thence by steamer down the Tyne to North Shields, and from there by tram to Tynemouth, where tea was served at the Bath Hotel. The homeward journey was made by electric train.

EVENING CONCERT.

On Wednesday evening Professor Bedson gave a demonstration of coal dust explosions in the Chemical Lecture Theatre, Armstrong College, which was followed by an impromptu concert, at which Sir Edward Evans presided in his usual genial way.

THURSDAY'S EXCURSION.

On Thursday morning the visitors left Newcastle for a day excursion to places of great historic interest. The first halt was made at Corbridge, where an antiquarian survey is being made. The work has already revealed a built road from the old bridge up to the station "Corstopitum," and eight sites have been explored. Resuming the railway journey, the members of the Conference passed Dilston, the stronghold of the ill-fated Earl of Derwentwater, and disembarked at Hexham, where the party was conducted over the Abbey by Mr. J. P. Gibson, of Hexham. Luncheon was served at the Corn Exchange, Mr. G. Weddell presiding.

After luncheon the train journey was continued to Naworth, where the castle was visited, by the kindness of the Earl and Countess of Carlisle.

Some of the party walked along the beautiful ravine to the picturesque ruin of Lanercost Priory.

The homeward journey was resumed at 7.45, and on arrival at Newcastle a vote of thanks was given to the Local Committee.

FRIDAY.

Many members of the Conference prolonged their stay in Newcastle, and visited, under the able guidance of Mr. J. P. Gibson and Mr. Maltby Clague, various points on the Roman Wall.

HONORARY MEMBERS.

LADENBURG, Albert, Ph.D., Hon. M.D., Professor of Pharmacy, University of Breslau, 108, Kaiser Wilhelm-Strasse, Berlin.

MAIDEN, Joseph Henry, F.L.S., Director of Botanic Gardens and Government Botanist, Sydney, N.S.W.
MELLO, J. C. de, Campinas, Brazil.

PETIT, A., Rue Favart, 8, Paris.
PRAIN, David, Lieut.-Colonel, I.M.S., M.A., M.B., LL.D. (honoris causâ), Director of Royal Botanic Gardens, Kew.

REMINGTON, J. P., Professor of Pharmacy, College of Pharmacy, 145, North Tenth Street, Philadelphia, United States.

SAUNDERS, W., London, Ontario, Canada.
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TSCHIRCH, Prof. Dr. A., Direktor des Pharmazeut. Institutes, Der Universität, Berne, Switzerland.

FOREIGN AND COLONIAL MEMBERS.

Aickin, G., The Pharmacy, Queen Street, Auckland, N.Z. (Year-Book to Evans Sons Lescher & Webb, Ltd., Bartholomew Close, E.C.).

Backhouse, H. N., 5, Rue de la Paix, Paris.
Baker, C. F., c/o Smith, Stanistreet & Co., Calcutta.
Barnes, Prof. J. H., B.Sc., F.I.C., F.C.S., Government College of Agriculture, Lyallpur, Punjab, India.
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Bowen, Dr. W. A., The Pharmacy, Mombasa, British East Africa.
Branch, G. T., c/o Strachan & Co., Umtali, Rhodesia.
Brownscombe, W. J., Bridge Road, Richmond, Melbourne.
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Gasson, W., Kimberley, South Africa (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).
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Ogburn, J., Charlton, Victoria.

Paddock, M. V., St. John, New Brunswick.
Pincus, Max, Castlemaine, Victoria.
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Pond, J. A., Auckland, N.Z.

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Samuel, J. B., Mussoorie, India (Year-Book and Letters care of A. Lawrie & Co., 14, St. Mary Axe, E.C.).
Say, S. V. B., Benalla, Victoria.
Scammell, L. R , Adelaide (care of F. H. Faulding & Co., 54, Great Tower Street, E.C.).
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Shillinglaw, H., Swanston Street, Melbourne, Victoria.
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Speechly, E., Kurachi, Scinde, India (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).
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Stevens, H. F., 140, Worcester Street, Christchurch, N. Z.
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Tanner, J. B. H., Nathalia, Victoria.
Thomas, H., Croydon, Queensland.

Towl, Chas. E., care of Chas. Ogg & Co., 76, Collins Street, Melbourne, Victoria.
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Turner, David, The British Dispensary, Singapore.

Varley, F., Wynberg, Cape Colony (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).

Walker, Geo., The Dispensary, Penang (Year-Book to Evans Sons Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
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Watson, Edwin L., c/o D. Waldie & Co., Konnagar, E.I.R., Calcutta.
Wheeler, F., Grant Street, Alexandra, Victoria.
Wilkinson, R., Dunedin, New Zealand.
Woolcott, J. N., Warracknabeal, Victoria.
Woolnough, H. A., Wyngate Buildings, Carrington Street, Melbourne.

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Abraham, T. F., 87, Bold Street, Liverpool.
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Alexander, Wm., 57, Low Street, Banff.
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Allen, K. C., 7, Cowper Street, Finsbury, E.C.
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Anderson, James, 70–74, Commercial Street, Dundee.
Anderson, John, 14, Strathmartine Road, Dundee.
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Arkinstall, W., Fernleigh, Market Drayton.

Arnfield, J. C., 7 & 9, Lower Hillgate, Stockport.
Arnold, H. R., 16, Coleman Street, E.C.
Arrandale, J. S., 16, Queen's Gate, Bolton.
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Ashton, F. W., 11, Addiscombe Road, Croydon.
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Atkins, J., Stafford Street, Birmingham.
Atkins, S. R., J.P., The Mount, Elm Grove, Salisbury.
Atkins, W. R., Market Place, Salisbury.
Atkinson, J. G., 25, Westow Hill, Upper Norwood, S.E.
Atkinson, John W., 1A, Birchfield Road, Birmingham.
Atkinson, Leo, 285, Brockley Road, S.E.
Attfield, Prof. J., Ph.D., F.R.S., "Ashlands," Watford, Herts.
Austen, Josiah, St. Gothard, Minstead Road, Gravelly Hill, Birmingham.

Bagnall, Percy, Bow Street, Ashton-under-Lyne.
Bagshaw, Harold, 37, Yorkshire Street, Oldham.
Bain, John, "Bruntsfield," Bridge of Allan, N.B.
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Balmforth, A., 5, Grosvenor Road, Whalley Range, Manchester.
Bannister, W., J.P., "Burvale," Watford, Herts.
Barclay, Sir Thomas, 19, Lower Priory, Birmingham.
Barclay, Thomas, New Charford Mills, Saltley, Birmingham.
Barfoot, J. R. D., 72, West Bars, Chesterfield.
Barlow, Alfred H., Otter Works, Strangeways, Manchester.
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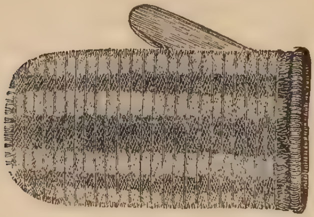

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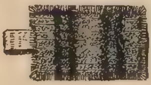

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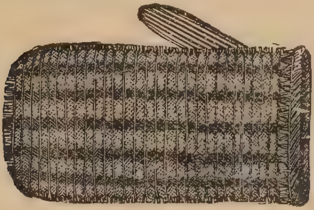

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